The Builder.

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Moulded Brickwork, or Terra-Cotta.

FEW subjects can offer more intrinsic interest to the architects of Great Britain than that which has received such interesting elucidation at the recent meeting of the Institute, reported in our last number. We allude to the use of what was there spoken of as *terra-cotta*, or, in other words, to the architectural employment of clay, moulded by pressure, or by the hand, into artistic forms, and then hardened by fire. We wish to avoid, in the first instance, the exclusive adoption of a name which is not ordinarily applied to a structural material, because the most correct method of dealing with the subject is, to regard it as merely a late improvement (carried to a high state of perfection, four centuries ago, in Italy) of the most ancient artificial material of the builder. The moulding of clay, and the application of the heat of the sun to harden the object moulded, was almost the earliest art of which we have any record or relic. The separation of this art into two branches, that of the potter and that of the builder, is as yet among the undated inventions of a very remote antiquity.

So late as in an Egyptian tomb of the eighteenth dynasty, we find representations of the fabrication of vases *without* the use of the wheel. Thus the application of this simple implement, the use of which gave a distinct artistic position to the manufacture of utensils, as separated from the manufacture of bricks, can hardly be carried back with certainty to a date much more remote than 3,000 years.

In a monument erected during the reign of the same eighteenth Egyptian dynasty, we find a representation of the whole process of brick-making. It was carried on almost precisely in the same manner as it is with us in the present day, with the sole exception of firing. The mixing of the clay, the fetching water in a bucket from a pond, the moulding in a wooden mould (with a fixed head, wider than the mould itself, instead of our present strike-stick), the carrying of the bricks suspended to a sort of yoke, and the setting them in order to dry,—all these things were done in Egypt 3,000 years ago, with a precision of which we have distinct contemporary testimony.

The step in the manufacture of brick which first converted a temporary into a permanent building material, was the substitution of kiln-drying for sun-drying. Exact date may here again fail us, yet we are not without some chronological information on the subject. The brick-kilns near Pharaoh's palace at Tahpenes are mentioned in the book of Jeremiah. The Egyptian monarch referred to was Ouaphris, the Apries of Herodotus, and the Pharaoh Hophra of Scripture, who reigned at Sais from 588 to 569 B.C.

Again, there is such a reference to a furnace in the Book of Daniel as to lead to the impression that bricks were burned at Babylon in the reign of Nebuchadnezzar, which was partially contemporary with that of Apries.

The bondage of the Israelites in Egypt is spoken of as passing through the "iron furnace." Here, again, it is rather inference than direct proof which points to the use of the kiln.

But in the British Museum we have the actual bricks of Nebuchadnezzar, Nabonadius, and other Chaldean and Assyrian kings, fired to a hardness that has resisted the tooth of time for twenty-six centuries, and stamped with the names of the great kings in whose works they were employed. These Assyrian bricks were, more properly speaking, tiles, varying in square dimensions from 15 in. or 16 in. downwards, and running about, or under, an inch in thickness. The most ancient monarch whose name has yet been deciphered on the Asiatic bricks is that of Uruck, whom few will doubt to be that same Arioch, king of Ellasar, who was contemporary with Abraham. Thus we have in our museum a *signed* piece of *terra-cotta* (baked earth) more than 4,000 years old.

The next ancient form of brick with which we are familiar, not only from the study of foreign architecture but from that of Roman work in this country, is only a reduction of the Assyrian brick or tile, of which, indeed, the later specimens are smaller than the earlier. The Roman brick was a thin tile, laid generally in three courses, in excellent lime cement, as a bond in honeycomb (*opus reticulatum*), rubble, or other work. The Italian building brick of the present day is very similar to the ancient Roman form; and in those parts of Italy where tufa forms a cheap and readily-available building material, *mattone*, or brick, is considered as the nobler substance, as being less liable to injury from weather. Little, if any, progress has been made in Italian brickwork since the times of the earliest specimens.

Of the English brick,—its price, its handiness, its ugliness, its durability,—it is unnecessary here to speak. With the exception of certain kinds of fire-brick and face-brick, the present form, colour, and workmanship of our bricks are such as to justify the language of the architects who speak of brick as "a low material." The elevation of this form of material, by the application of careful manipulation and of artistic form, is the object of what may almost be called the *terra-cotta* movement.

The object, then, of architects and of manufacturers is, to produce that union between the structural and the decorative treatment of burnt clay, in order to its use as a building material, which will result from the combination of the work of the potter with that of the brickmaker. That the plain portions of a building should be constructed of square and simply-moulded bricks, relieved in proper proportion by more elaborately wrought work, of similar, but more carefully prepared material, is a proposition so simple and natural that our only wonder on the subject must be that it has been so long unrecognised as an object to be constantly sought by the builder.

When the important question of durability is raised, the first consideration to bear in mind is, that of the known antiquity of brickwork. Further, we are aware that, of all human work, that which is apparently the most indestructible, except by violence, is the rudest form of earthenware. The lamps, the vases, the pitchers, of the earliest Italian tombs, are instances of this durability. In the *débris* of ancient ruins, amid the 70 ft. of fragments that bury the base of the Haram walls, at the bottom of Swiss lakes, deep in the alluvial deposit of the Nile mud, discoverers are continually stumbling on pieces of ancient earthenware. If an urn can be made to last for four or five thousand years, why should not a cornice or a column?

In fact, so far from there being any cause to fear for the durability of clay mouldings, when properly mixed, tempered, and fired, there can be no doubt that such a material is far more enduring than almost any natural substance. Mr. Page called the attention of the Institute to the weathering of Waterloo Bridge; and, on a recent examination of that graceful structure, we made a similar remark. The slow decomposition of the felspar, has given a granulated face to the wrought granite. In the present stage of decay, the appearance is highly picturesque. But it is clear that granite will not be eternal in the atmosphere of London. Marble is more rapid in its disintegration. Bronze itself is not able absolutely to resist the tooth of time; and, in all these materials, *ce n'est que le premier pas qui coûte*. It takes far less time to convert a slightly decayed surface into a deeply decayed surface, than it does to effect the first lodgement for the process of dilapidation. What is the ultimate result of the process may be seen on the sides of Vesuvius. The lava which, as we write, is pouring in a fiery river from the cone of the volcano, solidifies into a stone, which is harder than granite. Blocks of this stone may be seen at any time in process of being quarried from the site of ancient lava streams. The streets of Naples are paved with this material. So were the streets of Pompeii two thousand years ago. But many parts of the side of Vesuvius are covered with vegetation; and the soil which now supports the vine or the fig-tree, is nothing but lava disintegrated by time.

For this important question, therefore, of durability, the only thing that remains uncertain is, the best selection or admixture of material. On this point the main difference of opinion lies between the use of a mixed substance, one of the constituent parts of which should, when the whole is fired, act as a flux; and the employment of a simple fire-clay, or the protection of the surface of a homogeneous clay by a glaze, applied by means of a second firing. In addition to these two principal types of work, our readers may have observed, a fine, pure, red clay from South Devon was shown to possess very high qualities as a plastic material. As to its durability no evidence was given.

The point, however, which, as it appeared to us, was left out of sight was this. What is the exact chemical constitution of the most indestructible *terra-cotta?* The most successful modern manufacturers rely upon "rule of thumb." The scientific speakers dwelt on the advisability of well-directed experiment. But to take a rude Etruscan vase, of the coarsest description, and to ascertain by exact analysis of what it actually consists, seems to us to be the first *desideratum*.

In all descriptions of pottery, except in such as consist of pure homogeneous clay, fragments of older material of the same nature (burnt, of course), crushed to powder, form an important element. The process of baking has produced an ascertainable chemical effect. It is important to know what that effect is. When we know exactly what old stoneware chemically is, we shall be in a position to ascertain what part its fragments play in the paste we are to-day mixing. When we know what we have, we shall know what we want. We shall then, there can be little doubt, be able to attain this in the most direct and simple method. Let it be known what is the constitution and what are the conditions of indestructible pottery, and we shall be able, with little question, to produce indestructible *terra-cotta*.

Of the architectural value of this knowledge it is almost unnecessary to speak. When we remember how the great *desiderata* of cheapness of original material, of durability (without which there is no real cheapness), and of ready facility for receiving any requisite form, are combined, or, at all events, may be combined, in *terra-cotta*, there can be no room to doubt that an immense impulse will be given to decorative architecture by its employment.

Nor are we entitled to speak of this employ-

ment as novel, or as of altogether our own invention. There is, indeed, much that is new, as well as much that is beautiful, in the specimens that adorn the elevation of the new "God's Gift" college, as well as in the floors, and walls, and columns of the Kensington Museum. But let the architect recall the noble moulded brick chimney-stacks of some of our Elizabethan mansions. Let the decorator remember those ancient and honoured "Dutch tiles," from which so many, besides Dr. Doddridge, were taught Scripture history by the lips of a mother. Let us glance at the enormous *plaque*, containing the arms, and mottoes, and badges of the good King Réné, blazoned in their appropriate colours, which is to be seen at Kensington, as fresh as when it was moulded and fired some four centuries ago. Let the visitor to Cintra recall that fantastic apartment, floored and walled with tiles, in which converging streams of water are suddenly directed on the unwary guest. In those climates where the free sprinkling of water, whether by hand or by the jets of a fountain, is the most grateful luxury of the hot summer weather, the employment of glazed earthenware for structural and for decorative purposes has long played a most important part among the materials selected by the architect.

We do not altogether sympathise with those who expect that London is to be made "beautiful for ever" by the introduction of the glazed, polychrome, moulded, china-work, of the manufacture of which the artists at South Kensington are attaining such facile mastery. It is a very great question how far such a style of decoration is suited either to the grey tints of our climate or to the sober tastes of our people. In many cases the power to command a cheap, imperishable, obedient material, easily and indelibly stamped, at the will of the artist, not only with a certain sharpness of outline, but with a distinct variety of colour, may be of extreme value. But for long lines of street architecture, the paler tints of *terra-cotta* will no doubt be generally preferred. Nor do we think that, if durability can be secured without it, as there is every reason to expect, a high glaze is to be chosen, excepting in the case of fountains, or of work unusually exposed to the action of water. Yet in obtaining a full knowledge, and an absolute command, of a material of such wide and varied applicability, the architects of the present day are making a great stride in advance. We hope that the well-earned reward of full pecuniary success will attend the exertions of the several manufacturers who have so worthily emulated each other. There is room for them all. There will be more room, and more custom, when they have replaced the "rule of thumb" by the exact knowledge of the chemist. It is all very well for them to ask Government to aid them in this respect, but are they not competent to set their own shoulders to the wheel? However rapid may be the future progress of this latest development of one of the most ancient methods of manufacturing a structural material, the gratitude of all those who take interest in the progress of architecture is due to the men who have, whether professionally or commercially, done so much to shed on this important subject the light of practical and successful experiment.

NOTES ON ARCHITECTURAL DETAIL.*

All great works of art, whether in poetry, painting, music, or architecture, depend upon the elegance and proper application of detail for the realization of the effect aimed at. There is, however, in the case of architecture, this difference, that its products being utilitarian as well as ornamental, the detail must be subservient to the purpose for which the building is erected, for wherever the property of usefulness is lessened by the ornamentation there the ornament is bad. An architectural work is not produced to insure a mere transitory sensation of pleasure: it is a lasting monument of the ability or incapacity of the designer, and must be treated in a serious and conscientious manner. Mere whims and vagaries may be allowed in ephemeral works of poetry and music created to please the passing hour, and even in the more perishable and less obtrusive art of painting; but in architecture they should be altogether eschewed as inapplicable to so serious and substantial a thing as a building. Like the work of the historian, it may have the grace of style and a certain play of the imagination, but these should be strictly confined within the bounds of truthfulness and reality. This appears all the more evident when we keep in view that the works of the architect, although first produced on paper, are intended to be reproduced in the most substantial and least perishable materials, and that they cannot be pushed out of sight or destroyed without much labour, cost, and inconvenience.

The first attempts at art by a nation emerging from barbarism are invariably characterised by magnitude and rudeness of construction; but as a feeling for art grows, less attention is paid to mere bulk, and greater care is evinced in the preparation of the materials and in the endeavour to produce good proportion and elegant detail.

The architecture of Nineveh and Egypt commands our admiration for its massiveness, and consequent grandeur, more than for its beauty: it is not high art, in the truest sense of the term. There is much good art shown in parts, but the waste of labour and material is enormous, such, indeed, that it would be impossible to command in modern times, were we disposed to imitate it: we shall, therefore, pass at once to the architecture of the Greeks, whose works of art have never been surpassed by those of any other nation, whether as regards beauty of detail or elegance of proportion. And, first, I would observe, that the finest sculpture will not compensate for bad proportion and inelegance of outline; accordingly we find that the Greek architect bestowed the utmost care upon the attainment of this essential of good architecture. Unity, rather than multiplicity of effect, was his constant endeavour, and every detail was subordinated to the general effect and outline of the structure; but at the same time the element of variety was called into play in the adjustment of the various parts. Thus, in the columns and the frieze, the detail is repeated, while in the pediments and metops it is varied; in the latter the leading lines are diagonal, in the former they are vertical. Another thing to be observed is, that the bearing members do not show high relief in the ornamental detail,—that is only found in the pediment and such parts upon which the eye can rest, and where depth of shadow is obtained by the enrichments.

It is instructive to observe that the Gothic architects acted upon an entirely different principle, producing an entirely different result. Classic architecture produces the impression of repose, Gothic of unrest; the one clings to the earth, the other soars heavenwards; the one is the product of intellectual culture, the other of a spiritual faith. The Classic sculpture, although exhibiting more action than the Gothic, is characterised by greater repose. The Greek architect concentrated his forces; the Mediævalist dispersed his; while, luxuriating in an endless variety of detail, the Gothicist gives a monotony of attitude to his sculpture, whereas the Classicist, while repeating his detail, varies the attitude of his figures; and yet the eye dwells upon the group in the pediment, and it wanders from figure to figure on the Gothic façade. Then, again, there is this marked difference between the two styles: in the Classic temple the human element is prominent, in the cathedral it is subordinated; the figures in the pediment are visible at a great distance, the saints in their niches require to be sought out; and, to complete the catalogue of contrasts, the sculptures in the Greek pediment and frieze were less conventional than those placed amongst the Gothic fretwork; whereas the foliated enrichments of the Classicist were more conventional than those of the Gothicist. Is further proof necessary of the truth that no definite rules can be made to apply to works of architecture? for it cannot be denied that the two great styles are each of them possessed of peculiar beauties, although these are obtained by diverse methods.

The detail of Greek architecture is so perfect of its kind, that there is nothing in it to censure or avoid, unless, indeed, it be the spiritless copying and misapplication of it.

Beautiful, wonderfully beautiful, as is most of the Gothic detail, there is much of it that should be avoided in our modern practice.

The architects of the Renaissance, in their endeavour to be original, abused the beautiful features of the style they professed to admire in the most senseless manner. The pediment, the crowning beauty of the Greek temple,—with its group of statuary sheltered within the triangle,—they broke at the apex, producing one of the greatest abortions in architectural practice. I had thought that its deformity was so manifest to every one having a due appreciation of the beautiful in art that it would not have been repeated in these days of enlightenment; but it has, as you have doubtless all of you observed, recently cropped up in this city.

The complete triangular pediment, again, is sometimes used over an arch, and it only requires a glance at our Tron church to perceive how incongruous is the association. A love for littleness and fritter of detail is shown also in the breaking up of the frieze into small parts, whereby all repose is lost, and a feeling of discord between that feature and the column is produced. When this practice is followed, each pillar seems isolated, and to have no other duty to perform than to air itself in front of the structure it professes to strengthen. Perhaps it supports a vase or a statue; but that only renders the absurdity more apparent: it always brings to my recollection a figure in bronze I once saw representing Atlas, who seemed to be straining every nerve to support a glass globe between his shoulders, which a Cupid could have balanced between his fingers and thumb.

There is another practice to which I cannot reconcile myself, the use of half or three-quarter columns. A column, I conceive to be a structural feature required to support a weight; and it appears to me to be misapplied when used to strengthen a wall surface. Where that is necessary, a well-developed pilaster seems more appropriate, as it is a mere thickening of the wall surface. The engaged column, again, has a disagreeably stuck-on look; and this peculiarity is still more apparent when it runs up two stories of the façade. This remark does not apply to slender shafts, which are not, and do not present the appearance of, structural features.

Rustication applied to a wall surface or angle is useful where emphasis is required, by giving an impression of strength; but the reverse effect is produced when it is used in a column. It has in that position the additional fault of disturbing the harmony of the lines, and producing a feeling as if the work were unfinished. A lintel formed of one stone, and cut into to appear as if built in several pieces, is one of the most absurd shams extant; it not only weakens the lintel in reality, but has the appearance of weakness. In a *bonâ fide* arch the case is quite different. Rustication should, I think, be confined to the under story of a building, and never be used above a plain wall surface. In short, as I before stated, its use is to give emphasis and an effect of weight or strength, and it should, as a rule, be sparingly applied, unless there is a considerable surface of unpierced wall.

When you see a door-knocker in the shape of a leg, a bell-pull in that of a hand, a foot-scraper on which you have to clean your boots upon dragon's wings, a column surmounted by a vane doing duty as a chimney, and such like, it is a sure sign of the weakness of the inventive faculty of the inventor. And such is still the case when inverted consoles are used as buttresses, and where buttresses in miniature are carved on bench ends, and even when buttresses of any size are used where not required as a structural necessity.

Excessive relief in carving is one of the exaggerations adopted by the architects of the Renaissance,—a practice which they carried to the excess of attempting to produce perspective in bas-reliefs,—an attempt which has ever resulted in failure, and which is often productive of the most comical effects,—effects never intended by the designer.

All ornament that has the appearance of being stuck on to the wall-surface should be avoided; and such is the impression produced by festoons of fruit and flowers, which look as if hung on nails inserted in the wall, and in late Gothic a like effect is provided where shields are made to appear as if suspended in ribbons. Still more should any detail be avoided that appears ready to fall off. Some of the finest Gothic doorways have this defect. Statues are tortured into the form of the arch, and seem ready to topple from under their canopies upon those who enter or leave the sacred edifice. There is another mode of using details to which I would call your attention,—viz., the reducing of important features to infinitesimal proportions, and the opposite practice of magnifying small members into undue proportions.

I have a lively recollection of my first visit to the British Museum, seventeen years ago, when

* By Mr. W. G. Shiells. Read at the meeting of the Edinburgh Architectural Association, on November 18, 1868.

I stumbled upon an example of the former practice. I had spent some time in the narrow cell which contains the Elgin marbles, examining with a feeling of awe what I hardly comprehended. I then threaded my way amongst specimens of Egyptian art, and found myself in a corridor with a flight of steps at one end of it, the stone parapet of which was wrought into the form of *Doric columns*, of about 2 ft. in height, surmounted by an entablature! Of all features the Doric column, with its simple dignity and massiveness of proportion, is the least suited for such a purpose. I have read somewhere that "the baluster is the most successful invention of the moderns;" and certainly no more appropriate feature can be found as a boundary to a balcony or terrace, but it should be of such a height as to be easily seen over. I once crossed a railway bridge, intended to be ornamental, as it led into the grounds attached to a mansion-house. The parapets were formed of balusters nearly 6 ft. in height, and anything more hideously ugly I have seldom beheld.

The spiral form is only assumed by those plants which require support, as in the tendrils of the vine and the branches of the honeysuckle; it is never found where there is a weight to support; and a column, when convoluted, has a weak and bizarre effect, but slender shafts and mouldings, when so treated, are appropriate and beautiful.

Breadth and simplicity may be obtained by extent of wall-surface, and by giving depth of reveal to the openings; but this effect is destroyed if ornament is scattered in patches over a wide surface: it fatigues the eye, and produces a sensation of restlessness and disquiet. The eye should rather be encouraged to dwell upon what is beautiful, and be drawn by a well-regulated gradation from one point to another. The distance of the ornamentation from the point of sight should also be carefully considered. The figure of a man, or of one of the lower animals, correctly proportioned, will not appear so when placed on a height, and the individual features will be indistinguishable at a certain distance; a conventional treatment and exaggeration of parts is therefore required to produce a good effect. The posture of the figure and the flow of drapery must also be restrained, especially when the statue or group is detached from the wall-surface, or appears against the sky-line. The object sought after must not be the display of the sculptor's art, but the proper adornment of the building. This does not imply that the sculpture should be of inferior design, but that it be treated in an architectonic manner.

In the sculptures of the temples and palaces of Nineveh and Egypt, we are presented with representations of the daily life and customs of the people, so that we can form a pretty accurate idea of the social position of peoples who flourished 4,000 years ago; and so has it ever been when a true and living art was practised. We, on the other hand, think it a requisite of good taste to copy not only the general form of buildings designed ages ago, but to represent scenes and incidents in which we take so little interest that we hardly trouble ourselves to decipher their meaning. Why do we decorate our Gothic mansions with men in armour and crossbowmen in trunk-hose? Is it impossible to find good models amongst our dragoons and artillerymen? Would it not be more to the purpose to give a representation of a Lord Mayor's Show upon a City hall, than a copy of a frieze from the Parthenon? A corporation banquet might be made as jolly a sight in stone, and to afford as much pleasure to many as the reality.

I doubt not that some centuries hence our dress and customs will appear as quaint to those who then strut upon this world's stage as do those of the Middle Ages to us. A true and living art can only be obtained by delineating the social characteristics of the times, and the adoption of this course will be the necessary concomitant of a new style.

In this architecture of the future, I believe that colour will form an important element, and the proper application of it is well worthy of consideration and study. It appears to me to be a mistake to introduce different materials in the *construction* of a wall in order to produce variety of coloured surface. This is better effected by means of inlays of marbles or encaustic tiles, and the most appropriate positions for such enrichments are the wall surface between windows, and in string courses and friezes. A moulding, either plain or enriched, and of small projection, would be an appropriate framework for these inlays. Detached shafts and columns are also very effective when executed in a rich and durable material; but in this and every other application of colour, care should be taken to avoid harsh contrasts, and a meretricious glitter or spottiness of effect.

My remarks have been somewhat disjointed and fragmentary; the subject is a wide one and would need more time and knowledge than I can command to do it justice. It is easier to advise as to what should be avoided than what to follow; each must be left to choose a path for himself, and you will allow me to conclude by throwing out a hint that it will be more to your profit if you employ the time often spent in searching out tit-bits from the works of others in designing details of your own. Study the details of every style, but copy none; a comparatively poor original is of more value than a copy of a superior work; it is only the unsuccessful artist who takes to copying: he may make a livelihood by that means, but his name will die with him. An architect whose ambition is limited to mere money-making would be better employed in a more mechanical pursuit; and I cannot help thinking that many good butchers and bakers, shoemakers and tailors, have been spoilt to make most miserable architects. I hope better things from those I have been addressing.

SURVEYS OF SYRIA AND ARABIA.

Our readers will remember the hearty support which, on several occasions, we have given to the appeals of the Palestine Exploration Fund. While we are given to understand that this undertaking is still asking for aid, we are called on to help the promoters of a supplemental or complementary scheme for the survey of the peninsula of Sinai.

The object, no doubt, is one of importance, as well as of deep interest in many points of view. The names of some of the supporters of the undertaking, and especially of the Engineer officers who take charge of the survey, are such as to guarantee proper application of the funds which may be raised, and to promise reliable results. We do not know that the earlier explorers, our Palestine friends, claim, or wish to claim, a monopoly of the public support. Still we cannot help thinking that it would have been better to avoid such a duplication of machinery for objects so similar. There is no such immediate hurry. The accurate survey of Palestine would naturally be extended, in process of time, to the whole district covered by the description given in the Pentateuch. The wilderness of Sinai is but a portion of the land which must be delineated for our future Scripture maps. Pelusium, the site or the vicinity of "Shur, that is before Egypt;" Gerar, between Kadesh and Shur, the seat of Abimelech, who may, very probably, have been one of the Hyksos kings of the fourteenth dynasty; Goshen, the pastoral district, "in the best of the land, the land of Rameses;" Tahpanhes, where stood the palace of Ouaphris, or Apries, the seventh king of the twenty-sixth dynasty; are as intimately connected with the early Hebrew history, and as much demand the careful investigation of the practised surveyor, as does any portion of the Sinaitic peninsula. What is required is, first a clear and distinct programme of the work to be done, and then, a patient, well-ordered scheme for the application of the funds, which may be forthcoming, to the orderly prosecution of the details of the enterprise.

If we have a bit here, and a scrap there,—in one case the photographer left out for want of funds, in another the naturalist omitted,—in short, if enthusiasm directs the undertaking, instead of wise forethought, we shall fritter away our means, and disgust the public by repeated and ill-considered applications, before the real object of pursuit is attained. The field is wide and rich. Those of our readers who are acquainted with the exquisite engravings of "Forty Days in the Desert" can form some idea of what photography may do for the cave temples and ruined cities of Edom. There seems ample ground to conclude that the ruins of Rephidim, where Amalek fought with Israel, are to be traced near Wadi Feiran. Of the "eleven days' journey from Horeb by the way of Mount Seir unto Kadesh Barnea," the spot where Jordan, before the great geological convulsion that depressed the central part of its course, and formed the evaporating surface of the lake Asphaltites, fell into the Red Sea, there seems every reason to suppose that we shall be able to recover every detail. But we think it is taking a very narrow view of the question to assume that the thirty-eight years which intervened between the "turning" of the Israelites at Kadesh, and their crossing the brook Zered, were spent in the small peninsula of Sinai. They took their "journey into the wilderness by way of the Red Sea." That this was the retracing of their steps towards Egypt, seems to be inconsistent with more than one passage of the Sacred Record. Of the eighteen stations mentioned by name as resting-places, between the time when the spies returned to the wilderness of Paran, and the encampment at Ezion Gebir, or Akaba, not a single name is that of either of the former halting-places, a fact discordant with the idea of so limited an area, for the nomadic period of the Exodus, as that which is usually assigned to it. To fix these stations, it is therefore probable that a survey and exploration, on a far more extended scale than that which is now proposed, will be necessary.

We have on more than one occasion expressed our own views as to the principles which ought to regulate the proceedings of the explorers of Palestine. While the value of such a survey as our own Royal Engineers are in the habit of executing, is very great, still, at least from one point of view, the architectural information which may be gleaned by a methodical investigation is the most important object of research. Amid the desert intervening between inhabited Egypt and the Holy Land proper, there is much of a structural character to delineate and to investigate. In Palestine itself, as we have so fully urged, the important task of identifying the exact localities of the Holy City, by the systematic tracing of the foundations of those enormous walls which yet await the persevering investigator, seems yet to be unattempted. What the case really demands, then, is not dispersion, but concentration, of effort; not multiplication of enterprises, but more systematic pursuit of the investigation for which funds have been actually collected. We wish good speed to the explorers who have already sailed for the survey of the peninsula, as well as to those who may yet be sinking shafts and running galleries among the *débris* accumulated in the valley of Kedron, or in that of the Tyropœon. But to all those who, in the quiet of English parsonages or country houses, devote their leisure hours, and their spare guineas, to the search of local knowledge illustrative of the scenery and of the language of the Greek and Hebrew Scriptures, we would recommend combination of effort and well-directed unity of aim. The explorers of Palestine and of Sinai seem to be sadly in want of an engineer-in-chief.

NOTES FROM ABROAD.

Brunswick.—A second and exact copy of the celebrated Quadriga, in bronze, that crowned the chief front of the palace which was destroyed a few years ago by fire, is now being erected upon the former site, the entire building having been restored to its previous glory. The palace has always struck us, like that which was begun at Cassel, but was never continued beyond some 10 ft. from the ground, as much too large for the requirements of a third or fourth rate German court, and the rebuilding of this Brunswick palace would seem to indicate a greater reliance on Prussian non-annexation than we should have.

Berlin.—The municipality have determined to do away, as much as possible, with the system of the unsightly and untidy open markets at present held in the principal squares of this city. A large market-hall is forthwith to be erected upon the Dönhofs Platz, and a second upon the Gendarmen Markt.——Another free hospital has been determined upon, and the plans have received the sanction of the "director of charities," Councillor Dr. Von Esse.

Hamburg.—An International Floral Exhibition is to be held here in September next. The programme just published contains a section for "Garden Architecture," to which will be admitted ornamental green-houses, conservatories, summer-houses, park-lodges, small rustic bridges, entrance-gates, park-palings, iron railings, and other objects of landscape gardening. A committee has been formed under very high local patronage, and a guarantee fund of about 10,000*l.* will be formed, the greater part of this

sum being already subscribed.——The Church of St. Nicholas, by Professor G. G. Scott, contains a number of external niches, and these are gradually being filled with statues, thanks to the liberality of the citizens, thus adding materially to the finished beauty of the whole edifice. Thus there are now in their respective places: the four Evangelists on the tower; St. Ansharius (by Professor Siegel, of Athens), Luther, and Melancthon, at the south porch; Erwin von Steinbach, Peter Vischer, and Albert Dürer on the south aisle; St. Nicholas (an old statue, restored by the Society of Christian Arts), Ziegenhagen, and Winckler at the north porch: Guttenberg, Handel, and Scheiermacher on the north transept; besides eight angels, four of which are on the gable of the south transept, and the other four on the tower, at a height of 200 ft. from the ground.——A very interesting exhibition of photographs by German artists is open here, and contains some perfect triumphs both as to clearness and colour, as also in regard to verticality of lines. A very pretty wooden building has been erected on some waste land near the Exchange for this purpose, by Herr F. George Stammann, architect.

Prague.—Some months ago a building society was formed here, for the purpose of erecting houses for the working classes on a very extensive scale. It seems to have answered so well, even in this short time, that several other towns of Bohemia are now following the example set in the capital.

Trieste.—A very large fish-market, to be supplied by the Adriatic, is about to be erected here. Twelve designs were received, in answer to public advertisement, six being from local architects, and the committee is now deciding upon their various merits.

ON THE ANTIPATHIES OF ARCHITECTURAL GRAMMAR.

GLASGOW ARCHITECTURAL SOCIETY.

At the last meeting of this society, a paper was read, by Mr. Horatio K. Bromhead, "On the Antipathies of Architectural Grammar;" being a consideration of how architectural ornament ought and ought not to be combined. He said:—

Before more definitely pointing out the precise section intended it were well to express that the absence of a predecessor's footsteps must be the apology for any incomplete and crude treatment of the subject; the "Grammar of Ornament," by Owen Jones, being the only work known to me as approaching it. But that magnificent work does so, as it were, from the opposite side from that selected for this paper. The "Grammar of Ornament," as understood by me, principally tends to show the inevitable and grand principles that must exist in architectural æsthetics; whereas it is now attempted to take the negative view, and consider as much as possible what may be argued as not allowable, by indicating for consideration adverse or restrictive principles, founded upon those great and glorious relics which our noble art has bequeathed to us.

In art generally, the restrictive principles are so simple, and the issue is so evident, that they have not required much study. This clearness is, perhaps, largely owing to the plain and facile verdict which so inevitably follows any violation of æsthetics. If we for a moment imagine the production of a piece of ideal painting or sculpture with an error destroying its general harmony, we at once think with satisfaction of the unremunerative limbo to which it would be consigned. Fortunate it is for the world that artists and sculptors are able to see their own works first themselves, and rectify errors then apparent; and further fortunate for them that many causes irresistibly lead to the formation and activity of a tribe of critics whose volubility is so irrepressible, that the recipient can silently take advantage of the one good point, while deriding the empty garrulity accompanying it. But it is well carefully to bear in mind that it can be said we are not blessed with an architectural limbo. We are enabled to see in the works of architects how admirably some are able to preconceive and avoid errors, and the want of this power in others, as evinced in the painful monumental proofs which they set up, and are unable to destroy. This may appear to be wandering from the end in view, but a careful consideration will make apparent that we are at the very foundations, for how can we study architecture to the advancement of art, if we accept every existing erection as beautiful and perfect, without measure or qualification? at the same time overlooking the possibility that some of the architects, after they had seen the completion of their works, would gladly and publicly have repented in sackcloth and ashes, if they could only have thereby been enabled to remove some of the accomplished errors then for the first time detected.

It has been most generously asserted by some of our esteemed art-brothers, the artists and sculptors, that architecture is entitled to a first rank among arts on account of its universal need. I do not enter into the question further than to suggest that, if architecture be entitled to such an important position, its first claim would probably be founded on the necessary absence of experiment with regard to the production of its great works. We cannot paint out what we do not like, and designing our model, full size, in soft clay, is equally impossible. With this argument I to some extent account for much that is bad. Looking through works, one cannot help thinking that some are prominently good in planning arrangements, or æsthetics, or acoustics, or engineering construction, or carpentry, or masonry, or painting, &c., to the injury of other important requirements. Here I am not aiming at men who were trained as engineers, carpenters, masons, &c., and afterwards became architects; for most men, after so changing, could earnestly work through a great quantity of the remaining architectural knowledge in a few years, overcome the bias of the first education, and perhaps equal the average number of those who have been properly-trained architects for the same length of time; but am pointing out that some works indicate an unbalanced, biased, or lamentably deficient education by an error in some one, or more, essential yet neglected item; and also a tendency to give objectionable prominence to one section of architectural knowledge or building material. This, as I term it, negative way of looking upon art, appears to me very much neglected by the present generation of architects. The greater number of people are quite alive to the fact that the disagreeable man seldom says more than one offensive thing in an interview. The most notorious liar earns his reputation as easily; yet an architect who is quite aware of this and regulates his conduct with the utmost propriety, will sometimes be found, apparently without the least care or thought, blindly setting up buildings with at least one grave error; and when he has erected sufficient to stamp his character, feels particularly aggrieved that the public look upon the good points of his works as nothing but what was his duty to do; and, seeing the faults, set him down as of no great ability, and try the next new man in the hope of something better. I believe that an unduly large proportion of important buildings erected during the last few years could be identified by the mention of the worst architectural feature in each, and that the farther back the time under consideration is extended, the smaller the proportion will be; and, if so, there is cause for plain speaking and serious consideration. Taking the matter, however, at its smallest, it is assumed that all will admit the existence of errors in some of the architecture now existing; and, therefore, the difficulty lies in defining what is erroneous, and more particularly in endeavouring to lay down some propositions which, though they may require to be maintained with sufficient leniency for exceptions, may yet be considered generally good and sound. The following propositions have been hastily made out with a view to affording some definite ground on which the discussion to follow this paper may be continued, and the more easily become interesting and valuable:—

Proposition 1.—The origin, continued existence, and increasing isolation of the various styles of architecture indicate the opinion of many ages as most remarkably decided in asserting that there are sympathies and antipathies among architectural forms and colours that a correct taste cannot ignore, and that there are varied wants and requirements that have demanded and maintained a variety of style.

Proposition 2.—An architectural work should not have a single detail of form or colour that is not in harmony with every other detail, and with the use and situation of the work, but should be treated as a harmonious whole.

Proposition 3.—A new discovery, feature of design, method of construction or colouring, material for execution, or locality for erection, has often caused a transition time of modification, finally resulting in the rejection of a previous feature and the production of a different style of architecture that avoids the discords occasioned by the novelty. Transition styles are, therefore, of confused and imperfectly developed grammar; and a combination of styles containing unmodified parts of two or more distinct styles is flatly discordant and ungrammatical, and much to be condemned as a violation of æsthetics.

Proposition 4.—Architectural features, when used in several styles, though retaining the same name and skeleton, should not be so used without being modified in detail and outward form so as to possess a sympathetic character for each style. The principles and methods of colouring should also be subject to this proposition.

Proposition 5.—If a well-known feature or detail that is to be found in many buildings is very seldom to be found in the same building with another well-known style, feature, or detail, without modification, the combination, without the customary modification, is a discord that requires marked and careful sympathetic modification to become grammatical.

I cannot hope to exhaust the subject in the necessary limits before me, so will only attempt a single illustration—that of the column. In the great works of all ages we find each particular style has a carefully-modified base, shaft, and capital to its columns. First, confining the argument to any one style of one age, we find the detail so completely corresponding in sympathy that the designs of one building can generally be interchanged with those of another without any violation of grammar. Second, extending the argument to every age of one style, we find the sympathy fluctuating, being advanced, refined, and beautifully clear when architectural art was prosperous, and debased and partly lost when art was neglected. Third, still further extending the argument to be without limit, we strike, as it were, the very key-note. Where is the style without its columns? Consider them regardless of style. We may say that no good column exists without being clearly marked out as possessing base, shaft, and capital—ever the same names, ever the same triplet representation of honest strength. Consider them with reference to style. It is impossible to marshal forth in memory the different modifications of columns to be found in the different styles without being convincingly struck with the remarkable facility with which their sympathetic modification of detail enables every style to be distinguished. They may, indeed, be described as the very landmarks of style, endlessly varied, yet always a triplet "thing of beauty and a joy for ever."

HER MAJESTY'S THEATRE, HAYMARKET.

A report has been circulated to the effect that the money provided for rebuilding Her Majesty's Theatre was exhausted, the structure being simply in carcass, and that the works would be stopped unless other persons came forward to provide funds. We are enabled to say, not merely that this is incorrect, but that there are not the slightest grounds for the assertion.

The theatre is in course of erection, our readers may remember, from the designs of Mr. Charles Lee, assisted by his sons and partner (Messrs. Lee, Brothers, & Pain). A considerable amount of work has been done, considering the limited time which has elapsed since their commencement, by Messrs. Geo. Trollope & Sons, the contractors. The building is now roofed in, and the greater part of the ironwork and the stone stairs are fixed; and there appears little doubt, judging from the forward state of the building, as to the theatre being completed by the end of next March, according to contract. Scenery and properties would have to be provided, but that, of course, is a separate question.

The late theatre was burnt down on the evening of December 6th, 1867, and steps were at once taken to clear the site; but, for various reasons, the owner, the Earl of Dudley, did not finally arrange to rebuild until early in March this year, and on the 29th of May the works were commenced. We will before long give plans showing the old and new theatres.

In rebuilding, care has been taken to provide

the additional stage accommodation, before so much required, without materially encroaching upon the area of the auditorium; also to improve the entrances and exits; and the staircases have been arranged so that no part of the theatre will be without two, at least, staircases or passages of communication. There will be three saloons exclusively for ladies (the late house had no such accommodation); the boxes have been increased in height, and they will consist of four tiers and a half. No use will be made of the roof over the auditorium or stage, and the roof being of iron, the risk of fire will thereby be reduced; the carpenters' shops and painting-rooms, before in the roof, have been placed next the Haymarket, on the east side of the stage; the properties and stores have been provided for on the basement.

The stage is separated from the auditorium by a thick wall, continued through the roof, without openings, except for the stage; the floors of all the saloons, dressing-rooms, passages, and landings will be formed with Dennett's cement arches, and all the staircases will be of stone, inclosed with brick walls.

THE GRAVE OF ROBERT HOOKE.

NEAR to the site of old Gresham College, in the ancient church of St. Helen, Bishopsgate, lie buried, without a memorial stone to mark their last resting-place, the remains of an eminent philosopher and marvellous mechanic, Robert Hooke. Whether the fault rests with those who inherited his great wealth, or whether a tomb was erected and has since fallen to decay, I cannot ascertain; but at present he lies in an unhonoured grave in the midst of a city which has largely profited by the results of his earnest labour. The variety and extent of Hooke's inventions and discoveries are scarcely so well known as they deserve to be, and while drawing attention to his neglected grave it may prove useful to give a short account of the most important. The following, chiefly derived from a highly appreciative exposition of his mechanical inventions, by Bryson,* will, I think, prove that Hooke is justly entitled to a grateful remembrance. Like his great contemporary Newton, Hooke in early life was delicate, so that his parents had small hopes of rearing him; but after his seventh year his constitution seemed to gain strength. His mechanical genius, the strongest intuition of his nature, was first developed. In a short extract from his diary, Waller,† his biographer, says: "Being subject to headache, which hindered his learning, his father laid aside all thought of breeding him a scholar, and finding himself also grow very infirm through age and sickness, wholly neglected his further education, who, being thus left to himself, spent his time in making little mechanical toys, in which he was very successful. His father, observing by these indications his great inclination to mechanics, thought to put him apprentice to some easy trade (as a watchmaker or limner), he showing most inclination to those or the like mechanical performances." His taste for the fine arts seems to have recommended him to the notice of Sir Peter Lely, with whom he served but a short time, as the odours from the oil colours produced aggravation of his headache, which, beginning in his earliest years, continued to afflict him through life. This was, perhaps, for his fame and for science a fortunate adversity. In the year 1653 Hooke, then in his eighteenth year, went to Oxford, and by his mechanical genius soon gained the notice of the Hon. Robert Boyle. Here he seems to have found society and employment suited to his tastes from meeting Wren, Wilkins, and other eminent philosophers, who shortly afterwards founded the Royal Society of London. It was while residing at Oxford that he contrived for Boyle the first really efficient air-pump, and applied the balance or pendulum spring to a watch, by which and his subsequent discovery of its isochronal properties, he converted the machine which he found but a rude toy, into an almost perfect measurer of time. From a suggestion of Wren's, he made a series of observations of the barometer for the purpose of testing the truth of the hypothesis of Des Cartes, that the tides resulted from the pressure of the moon upon the air in its passage by the meridian. Hooke found that the oscillations of the mercurial column did not comport themselves according to the moon's motion, but were due to the varying density of the air. Thus the barometer became, in the hands of Hooke, not merely the Torricellian tube, but a weather-glass, or as he quaintly calls it, the "weather wiser." To him we are also indebted for the double barometer, the four-legged barometer, the wheel barometer, the diagonal barometer, and the marine barometer. About 1660 he invented what he calls his circular pendulum. It has, however, been termed a conical pendulum, being continuous in its motion. It was applied by Hooke to a telescope mounted equatorially, so as to keep the instrument always coincident with the star's motion, both in right ascension and in azimuth. This invention is more familiar under the name of Watt's governor of the steam-engine. Watt most ably applied it, but (what very few know) Hooke was the inventor. In the year 1662 Hooke was appointed curator of the Royal Society; and, in April of the succeeding year, he read before them an account of his discovery of the rising of fluids in capillary tubes. He also discovered that mercury was not subject to the same law, but was depressed in tubes in the ratio of their diameters. He also here hinted, what was afterwards discovered, that mercury in tubes made of different kinds of glass has a different ratio of depression. He also proposed a system of telegraphy by connecting between distant stations a wire, acted on by a series of vibrations or musical notes, and thus communicating almost instantaneous intelligence. In 1663 he invented the watch wheel-cutting machine, and in the following year a method of grinding spectacle lenses, by means of which more than 100 could be ground at once to the same focal power. This ingenious contrivance is daily used in our manufactories at Sheffield, but few know the name of its inventor. On the banks of the Avon you may be asked the question, Who was William Shakspeare? and in the workshop of the optician, Who was Robert Hooke? In the same year he invented an instrument to determine the refractive index of fluids. His life, indeed, at this time must have been a busy one. Macaulay eloquently tells us "how necessary it was for the fine gentlemen of the court of Charles II., when science had become the fashion, to have something to say about telescopes and air-pumps; and even fine ladies now and then thought it becoming to affect a taste for science, went in coaches and six to visit the Gresham curiosities, and broke forth into cries of delight at finding that a magnet really attracted a needle, and that a microscope really made a fly look as large as a sparrow."

In 1664 Sir John Cutler having founded a lectureship in connexion with the Royal Society, Hooke was appointed to the office at an annual stipend of 50*l*. Although science has, perhaps, gained by the publication of his Cutlerian lectures, to Hooke it proved a source of great trouble; as, through some misunderstanding, he became involved in a long and vexatious lawsuit for the recovery of his annual allowance, which appears to have soured his disposition for the remainder of his life. In the same year he was appointed professor of geometry in Gresham College, and continued for some time to read general astronomical lectures, showing a wonderful fertility of invention in devising instruments for astronomical purposes; describing a plan for a weather-clock, a quadrant, and erecting the first transit instrument. As this is intended more as a catalogue than a description of his earnest labour in the pursuit of scientific truth, I can only enumerate the subjects to which Hooke devoted his mind during his long and useful life.

In the year 1666, the Great Fire of London, though it disturbed the labours of the Royal Society, increased those of Hooke. On the 19th of September, we find him presenting before the Society a model for the rebuilding of the city. "What this model was," says Waller, "I cannot well determine; but I have heard that it was designed in it to have all the chief streets, as from Leadenhall to Newgate, and the like, to lie in an exact line, and all the other streets turning out of them at right angles; all the churches, public buildings, market places, and the like in proper and convenient places." This plan was not accepted, but it led to his appointment as surveyor by the City magistrates. In this situation he laid out the ground to the several proprietors for rebuilding the City, and acquired most of his wealth; none of which, it is believed, he ever used, as it was found in a chest after his decease.

The invention of the reflecting telescope has been awarded to Newton, to Gregory, and Hooke: the share which he had in the invention was in perforating the larger speculum, thus enabling an observer to view the object directly. In one of his discourses he clearly indicates the stethoscope. He invented the spring balance, now known as Salter's spring balance. To him we also owe the steelyard: although unknown to Hooke, it had long been used as the standard instrument for determining weight in China. He proposed the catenarian curve as the best form of arch; employed a heavy weight moving in a short arc for the pendulum, from which its sole advantage is derived. He had the earliest suspicion of what keeps the planets in their orbits, discovered that the density of the air in a diving-bell is doubled at the depth of 34 ft., invented a water-pump having an elliptical rotary motion acted on by a spring, and discovered the various forms which sand assumes when placed on a vibrating plane. He attributed the revolutions of the planets to the combination of a projectile motion with a centripetal force. Had his mathematical powers equalled his practical sagacity, he might have obtained the laurel which Newton so soon afterwards bore away. He discovered that Jupiter revolved in about eight hours. That he possessed the secret of the steam-engine is undoubted; he, however, hid it in the form of an anagram, which Waller thus translates,—"The air presses with force the vacuum left after the use of fire." As an astronomer he did much; as a geologist his views were in advance of his age. Speaking of fossil remains, he says that they belonged to extinct species, and even suggested that they may have disappeared in consequence of earthquakes in former ages, to which he attributes the elevation from the sea of the strata containing marine remains. In conclusion, Bryson remarks that, "Had Hooke been born fifty years after Newton, Newton would not have been less. Had he been born fifty years before the great philosopher, Hooke would have been more exalted."

H.

* Edin. New. Phil. Mag., 1856.

† "Posthumous Works of Robert Hooke." London, 1705.

PLANS OF PARIS.

A LIST was given in these pages* of the most ancient plans of London and Westminster known to be in existence: to this list, which must be of the greatest interest and assistance to all who are addicted to antiquarian or historical researches, as well as those who desire exact knowledge of the locality of facts connected with general literature, we are enabled to add a similar inventory of the plans of the City of Paris, from the last issue of the *Chronique des Arts*.

A collection will be made of all the plans of Paris that can be obtained, which will be placed in the Historical Museum of the City of Paris as soon as the alterations to the Hôtel Carnavalet, the former residence of Madame de Sévigné, in which the Museum is to be formed, have been completed. In point of number the ancient plans of Paris are inferior to those we possess of London, but they are sufficient to enable us to trace the progress of the city during the last four centuries, and if they could all be collected under one roof their usefulness would be greatly increased.

The following is a list of the most ancient plans extant:—

1. A manuscript plan found in the Abbey of Saint-Victor representing Paris about the year 1400. This plan was engraved by Dhuelland in 1756.

2. Another manuscript plan, constructed from a tapestry of about the same period.

There are no illustrations of Paris of a date anterior to, or contemporary with, these plans, with the exception of some views of public buildings on the margin of an illuminated manuscript of the fifteenth century, formerly belonging to the Duke of Bedford, and purchased by the city of Paris from M. Firmin Didot.

3. The plan of 1560, executed in the reign of Henri IV., and now in the Imperial Library.

4. An Italian plan dated 1566.

5. Quesnel's plan in twelve sheets, dated 1609 (reign of Henri IV.).

6. The plan of 1615 engraved at Amsterdam by Witt.

* Vol. xxv. p. 642.

7. Another plan engraved in Holland in 1620.
8. The plan of 1651, which only shows the streets.
9. The plan by Boisseau, 1652, and another by Gomboust, of the same date.
10. Cochin's plan, 1669, in three sheets.
11. Defer's plan, 1692.
12. Jouvin de Rochefort's plan, 1697.

From the beginning of the eighteenth century to the present time, the plans may be counted by hundreds. The principal are those by Félibien, 1725; the plan of the great Turgot, 1739; the curious plan by Bonamy, in 1740, in which year Paris was visited by a severe inundation; and the plan of Verniquet, in 1789.

A plan of Paris, on a large scale, showing the recent alterations, is in course of preparation by Baron Haussmann.

THE INSTITUTION OF CIVIL ENGINEERS.

GLASS FOR LIGHTHOUSES.

THE first meeting of the present session was held November 17th (Mr. C. Hutton Gregory, president, in the chair), in the new building erected during the recess, and upon the completion of which, according to the promise made by the council, the president congratulated the members; taking occasion to remark, that the council had placed upon their private minutes a unanimous vote of thanks to the architect, Mr. T. H. Wyatt. The president observed that the contractors, Messrs. Holland & Hannen, were also entitled to commendation, for the manner in which they had carried out the works within the time specified in the contract—a result to which the personal care of the secretaries had largely contributed.

The paper read was "On Lighthouse Apparatus and Lanterns," by Mr. David M. Henderson. It was stated that the glass used in lighthouse apparatus was nearly all made at Saint-Gobain or Birmingham, and was of the kind known by the name of crown glass. Different mixtures had been employed for the purpose; but M. Reynaud, the director of the French lighthouse service, now gave the composition as—

Silica	72·1
Soda	12·2
Lime	15·7
Alumina and Oxide of Iron	traces.
	100·0

At Birmingham various mixtures had been tried, of which several examples were given, the following being about an average:—

	cwt.	qr.	lb.
French Sand	5	0	0
Carbonate of Soda	1	3	7
Lime	0	2	7
Nitrate of Soda	0	1	0
Arsenic	0	0	3

English glass was supposed to be of the refractive index of 1·51. That produced at Saint-Gobain had formerly an index of refraction as low as 1·50, but now it was 1·54, and frequent experiments were made to ascertain that the standard was maintained.

The furnace for melting glass was generally rectangular in plan, and was constructed of the most refractory materials; and the sides were arranged so as to allow of the easy withdrawal of the pots. Six, and sometimes eight, pots were placed in the furnace, arranged in pairs with a firegrate at each end. The flame filled the whole interior of the furnace, and, after circulating round the pots, which were covered to prevent the colour of the glass being injured by dust, or impurities from the coal, found its exit by flues. Great care was necessary in the preparation of the pots, which were made of about one-half new fire-clay, and one-half old potsherds, finely ground. The length of time a pot would last depended upon (1) the quality of its manufacture; (2) its being slowly and thoroughly dried,—a process occupying about six months; and (3) the care bestowed upon it in the furnace, and whilst withdrawn for casting. The average number of castings from each pot was about twenty; and the time the pot was out of the furnace at each casting was about three minutes. It was mentioned that Mr. Siemen's regenerative furnaces were now in use for the manufacture of lighthouse glass with perfect success. When the metal was ready for casting, each pot was lifted from its seat, withdrawn from the furnace, and carried to the foot of a crane, the lifting chain of which had attached to its end a clip to embrace the pot. A mouthpiece of wrought-iron was fitted to the pot before casting, to facilitate the pouring, and the workmen tipped over the pot by means of long handles.

The casting-table was circular, and was mounted on a frame, so that by means of a handle it could be turned round, and each part of its outer circumference brought consecutively under the pot of molten metal. The moulds into which the glass was to be cast were arranged round the outside of this table, and were caused to revolve slowly under the continuous stream of liquid glass flowing from the melting pot, so that each mould was filled in succession, thereby enabling the immediate return of the empty pot to the furnace. The moulds were of cast-iron, of a uniform thickness of ⅛-inch, and were supported on feet cast on, the size being such as to allow ¼-inch thickness of glass all round for the grinding process. The small lens-rings and prisms were cast in one piece, but the larger ones were cast in segments. The large belts, or central lenses for fixed lights, were generally cast flat, and were afterwards bent on a saddle to the required curve in a kiln.

Sand, emery, rouge, and water were the four necessaries for glass grinding and polishing. The sand had to be applied, with abundance of water, until it lost its cutting qualities. The emery, after being ground to a fine powder, was agitated in water, and the mixture was passed through a series of vats or tubs, so that the emery was divided into as many qualities as there were tubs, the coarsest being deposited in the first tub, the finest in that furthest from the supply. The rouge, which was an oxide of iron, was prepared from the sulphate, and was separated into qualities by means of water-tubs, as in the case of the emery. The glass of optical apparatus was ground on horizontal circular tables, securely fastened to the tops of wrought-iron vertical spindles, which received motion from the main shafting in various ways. The surfaces of these tables were divided out, like the face-plate of a lathe, to receive the different sizes of "carriers," or supports of cast-iron, which were bolted to them, and were arranged to hold the lenses or prisms to be ground. Plaster of Paris was then laid on the "carriers" in bands, the bands being reduced to the exact size by turning the table round under a gauge secured to the framing of the machine. The glass was laid on these strips, and was secured in place by means of pitch, care being taken in the larger sizes, which were ground in segments, to place a thickness of pitch between each joint, so that glass did not touch glass.

ENGINEERING ARCHITECTURE.

IN the course of the address delivered to the "Civil and Mechanical Engineers' Society," by Mr. B. Haughton, the president, the speaker said:—The last discussion was, perhaps, the very best of the season, prompted by joint papers on "Engineering Architecture," by two of our oldest and most valued members. The meeting discussed the question with a spirit worthy of the combatants in the battle of the styles, even the visitors warmly assisting. This is a subject on which there is a great deal more to be said, and we will look forward to further consideration of it. It is one which the Society would do well to keep continually before it, because it is a line in which we can see our way, and in which every one admits there is room for improvement. It is, indeed, humiliating to think of the vast sums that have been spent in England on grand engineering works with an utter disregard of appearances, and where a modicum of æsthetic skill would have given us so much effect and beauty. It will be said that utility, and not beauty, should be the cry of the engineer; but this is, after all, only the twaddle of incompetency, for it is well known to those who have given attention to art that it costs no more to arrange materials in effective and pleasing forms than to pile them in the shapeless masses that attract the eye.

We must at once dismiss the assertion that beauty is costly; it is not meretricious ornament that is advocated, such as may be seen in at least one of the latest engineering works, and which is a reactionary effort, worthy of praise, as showing a step in the right direction, but still unworthy as having overshot the mark, and having given us, as it were, "a jewel of gold in a swine's snout." I allude to the Abbey Mills Sewage Pumping Station, the design for which is the more remarkable, seeing that it has come from the hand of the engineer who has shown so much artistic excellence in the severe lines in which the Thames Embankment is conceived.

What I ask you to aspire after in those engineering works upon which you are, and shall be in the future, engaged, is *form* in the æsthetic sense, in place of that *deformity* which is sown broadcast around us, in which the British engineer has hitherto glorified himself, and in which he would seem to wish to idealize and deify sheer *strength*, which in his simplicity he sees to be incompatible with beauty of outline. How, then, is this *desideratum* to be attained? The British engineer in his efforts to redeem engineering architecture must look to himself, and to himself alone; and the present recess is perhaps an opportunity given him for this very purpose, and to enable him to direct his mind to a subject which demands his closest attention. He will again, notwithstanding our prophets of evil, be called upon to construct works on English soil equal to, if not surpassing in magnitude, those of to-day. Let him endeavour in them to improve on those of a bygone generation, and to hand down to posterity a legacy of beauty in connexion with such works, as he has received from the past its legacy of strength and endurance.

Let him above all things refuse to entertain the thought that veneration for the beautiful is beneath him as a man, or derogatory to the dignity and character of his race; for during all time those races which made themselves famous for their prowess and their majesty, their power alike over matter and mind, were equally renowned for the beauty and for the magnificence of their public works—those monuments of glory by which, history apart, we can now alone judge of their aristocracy of race. If Egypt has had her Pharaohs of the camp and the battle-field, she has also had the Pharaohs of the Pyramids, of Thebes, and Phyle; if Greece has given to the world an Epaminondas and an Alexander, who has left his traces visible to this day upon the banks of the Satledge, the Dhelum, and the Indus, she has also given it a Phidias, an Apelles, and a Praxiteles, who live at this moment in the columns, entablatures, and friezes of the Acropolis, in the inimitable statue of the Venus, and in the thousands of miracles of art which have made their countrymen as a race unique upon earth; if Rome has had her Romulus, her Pompey, and her conquering Julius, who has left his stamp upon these banks of Thames, she has also had her Augustus and her engineers and architects by the score, beneath the walls of whose grand buildings the Englishman loves to wander during the period of his own dark winter; and if Carthage has had her Hannibal, she was also one of the most exquisite of cities. These facts should at once disabuse us of any idea that being possessed of an eye to admire, a head to conceive, and a hand to construct what is beautiful, is incompatible with those qualities of *physique* and of *morale*, and of general manhood on which we as a nation rely and pride ourselves; on the contrary, history tells us that the very highest types of the human race are those in which all these qualities have been combined, and, further, that wanting in any of them, we cannot claim to rank as equals, but only as degenerate and effete imitators of the mastering races named, sent into the world by the King of Kings and great Engineer of Engineers for the guidance and instruction of the 1,200,000,000 of his creatures who incessantly inhabit it, and whose instruction and example they stupidly reject and ignore.

Let us then look for better days for engineering art, and if we shall succeed in our aspirations and efforts to restore and to perfect it, when the time comes that we are to be conquered as a people—it may be by the Cossack, it may be by the Western Vandal—as conquered we shall be, if history is to repeat itself, we shall have that glorious consolation, which Horace describes as having remained to Greece after her conquest by Rome—"Captive Greece took captive her fierce conqueror and introduced her arts amongst the rude Latins. Thus, their rough Saturnian manners became polished, and delicacy expelled rank virulence; though for a long time remained, and this day remain, the traces of rusticity."

SCIENTIFIC INSTRUCTION.

THE annual distribution of prizes has been made to the pupils of the Lower Islington Public School Science Classes in connexion with the Science and Art Department. The room was crowded by the boys and young men, with their friends, who were gratified at the success that has attended the instruction given students by Mr. John Howard and his assistants. Professor Henslow, Mr. Edgar, of the School of Mines, Mr. Howard, and other gentlemen addressed the meeting. The Professor pointed out that in the hands of an able teacher the driest scientific subject might become wondrously interesting, and made the means of developing to the fullest extent latent mental powers.

Some inquiries have lately been instituted in Yorkshire respecting the means available for scientific instruction. Nothing effectual, it is thought, can be accomplished until there is a good supply of teachers, and it will, of course, be for the direct interests of the masters if they can earn further grants from the Government. To qualify them for scientific teaching the Yorkshire Board of Education is organizing special classes, and in Leeds thirty-five schoolmasters have already joined these classes. Altogether, no less than 100 schoolmasters in Yorkshire are now busy qualifying themselves for the Government certificate. When this is attained, the boys in 100 common schools will be able to learn the elements of science as a part of their ordinary education. The Board is endeavouring to supply the link which will be necessary to connect this elementary education with the higher grades of instruction. They propose to establish professional lectures for the elder pupils of primary schools, which will supplement the lessons of the masters. The boys will assemble weekly for this purpose in convenient centres, and it is hoped that a basis may thus be afforded for trade-schools in our chief manufacturing towns. One of the wishes Mr. Whitworth expressed was that the Government would assist in providing professors of mechanical science throughout the country; and, if this design could be carried into execution, it would exactly fall in with the plan proposed in Yorkshire. If the scheme thus sketched be completed, it is evident that a complete and graduated course of scientific instruction will be established; and it will have been provided in the only satisfactory way,—by local efforts, supplemented and guided by the Government.

PUBLIC IMPROVEMENTS IN OXFORD

FROM the annual *resumé* of improvements in the University and City of Oxford, in the local *Journal*, we give an abstract:—

Christ Church.—The window on the north side of Christ Church Hall has been filled with lights, commemorating the visit of the Princess of Wales and Denmark last year. The work has been executed at the cost of the Ven. Archdeacon Clerke, sub-dean of the college. A new road, 600 yards in length, is being formed across the Meadow, from that part of the Broad Walk facing the new buildings to the path opposite the boats. It will be lined, when completed, with an avenue of elms. Christ Church is further carrying out its excellent design for the improvement of the parish of St. Thomas. The notorious "Hamel" will soon be a thing of the past. In addition to the thirty tenements known as the "Model Dwellings," which have been built within the last two years, there are now in course of erection, and nearly finished, nine other new and commodious dwellings for the poorer classes. Two facing the High-street are for shops, seven front the old street or alley known as the Hamel, now widened to 30 ft.,—a good open airy street. These houses are solidly built, well designed, and fitted up with all necessary conveniences for the family of a working man. Each house has a sitting-room, washhouse or kitchen, and three bed-rooms, good drainage and water supply, and separate walled garden. They are being built by Messrs. Jos. Castle & Co., under the direction of Mr. Bruton, the surveyor of the College. The object sought in the improvement of the dwellings in flats and the cottages, is to provide for the accommodation of all grades of the working classes. The contrast between these cottages and those just pulled down or about to be removed, is very striking.

Exeter College.—The glass mosaic by Salviati, at present confined to that part of the chapel beneath the east window, is intended to be continued throughout the arcade of the apse.

Queen's College.—The east pediment of this college was found to be out of the perpendicular, and as Mr. Wilkinson deemed it unsafe, it was taken down immediately the long vacation commenced, and was soon rebuilt. The carving in the tympanum was also restored.

Merton College. — The ante-chapel of this college, which had become much decayed, is being thoroughly restored by Mr. J. Fisher, under the direction of Mr. Buckeridge, architect. The stonework of the windows, columns, and other parts of the structure is being renewed.

New Inn Hall.—A small chapel has been added to New Inn Hall, consisting of brick, with stone windows. The builder is Mr. Guise, of this city.

The New Museum.—New buildings are being erected on the north-west of the Museum, in connexion with the department of Experimental Philosophy. They will comprise lecture-theatre, students' and private laboratories, workshops for turning, photographic room, and examination room for Professor Clifton. These additions are being made out of a fund given to the University by the Clarendon Trustees. In general appearance, design, and material of construction, they will resemble the Museum itself. The architect is the same, Mr. T. N. Deane, of Dublin; and Mr. Symm, of this city, is the builder. The north front is to present a handsome elevation of nearly 100 ft. in width; the west of 84 ft. in width. The new additions, which will be connected with the Museum by a corridor, and will have a central court, are to be completed about May, 1870. The contract is for 10,285*l.*

London and County Bank.—The new premises for the London and County Bank, just completed, occupy a commanding position in the High-street, at the corner of Alfred-street. The style adopted is Tudor or Collegiate. The materials used have been the best white bricks of the neighbourhood for the several fronts, with Bath stone for all the stone details. The exterior is relieved by buttresses, projecting chimneys, and windows of varied design, and the angle is further diversified by an octagonal projecting window, which rises to the summit of the building and terminates in a turret with coped top, and iron terminal. The public room measures 43 ft. by 34 ft., and 16 ft. high, with boarded and panelled ceiling, with carved corbels and paterae. The gasfittings are by Hart & Co., Strand. The whole of the works, including the adjoining premises, will cost about 9,000*l.*; they have been executed by Messrs. Jones, from the designs of the architects, Messrs. Francis, of London.

St. Barnabas Church. — The Church of St. Barnabas is the title of the new edifice now rapidly approaching completion in the district of Jericho. The plan is of the Basilica type, and is a long parallel building with an apsidal termination at each end, that at the east for the altar, and that at the west for the baptistery. The choir place is at the east end of the nave, and will be marked off by a low railing. The clearstory is remarkable for its height, which gives to the nave a fine lofty effect. The aisles are divided off by arcades in the usual way, but the arch opening the baptistery to the nave, and the fine round arch and ceiling over the sanctuary are not common features. The roof, which is not of a sharp pitch, is of simple but effective construction, and boarded on the inside, the timbers being all exposed. The walls are constructed with rough wall stones of the district, put together with ground lias lime and Thames sand, and covered on the outside by a rough coating of Portland cement and sand. The window cills and heads, and those portions usually constructed of wrought masonry (except the columns and their capitals and bases, which are of Bath stone), are built with a concrete of cement, gravel, and other hard materials, made and cast in moulds of the requisite shape. The church will seat about 1,000 persons; and, it is said, will cost, owing to its peculiar method of construction, not much beyond half the sum usually required for churches of that magnitude. The architect is Mr. A. W. Blomfield, of London; and the builders are Messrs. Castle, of Oxford.

St. John's Mission House.—This is the name given to an Ecclesiastic and Collegiate establishment in Marston-street, in the newly-made Ecclesiastical district-parish of Cowley St. John, the new suburb on the east side of the city. It has been built by Messrs. Joseph Castle & Co. for the Rev. R. M. Benson, the incumbent of the parish. It has spacious offices and refectory in the basement, and the upper stories contain, besides a large "parish room," a common room, library, with conversation room adjoining, principal's room, and twenty-six rooms for men, each room fitted and furnished for separate occupation. On the top of all is a large, convenient, and well-designed chapel, fitted with stalls for over fifty persons, and capable of holding a good many more. The house is heated throughout by a system of hot-water apparatus, thereby saving trouble and inconvenience from separate fireplaces. The rooms, as well as the passages and corridors, are lighted with gas, and great care has been taken to give good and manageable ventilation. No attempt has been made at architectural display.

New Schools, Gloucester-green. — A Gothic structure has been erected on Gloucester-green for day schools in connexion with the Independent Chapel, George-street, but in which an unsectarian education is given. There are large class-rooms on the ground-floor, with entrances from Gloucester-green and George-street. Mr. Codd was the architect, and Mr. J. Hall, of Walton-street, has carried the work out.

Chapel-school, Hythe-Bridge-street. — At the corner of Hythe-Bridge-street, a Chapel-school for the boatmen and their children has been erected. The architect is Mr. Bruton; and the builders are Messrs. Jones & Sons. The new structure will cost about 350*l.*

COMPRESSED AIR FOR PROPELLING VEHICLES.

WE have often suggested the desirability of applying compressed air, or some such power, to the propulsion of street vehicles, whether coaches, omnibuses, cabs, or velocipedes. If what we now learn from America be correct, this desideratum has at length been realized.

Mr. Waylis, of New Orleans, has recently invented a locomotive car, which is said to have proved a complete success. In the car station there is an ordinary steam-engine, of about sixty-six horse-power, for compressing air into reservoirs, and two of these reservoirs are placed on the top of each car. On the car there is a small engine, operated by the air supplied from the reservoir in the same manner as by steam, and giving the exact amount of power that was required to compress the air. The engine is not difficult to run, and the cars can be stopped much more readily than when horses are used. Each car will have 300 pounds of compressed air to start with, which will be sufficient to run it nine or ten miles.

NEW TRAMWAY, RAILWAY, AND OTHER PROJECTS.

AMONG the notices of proposed applications to Parliament are the following:—

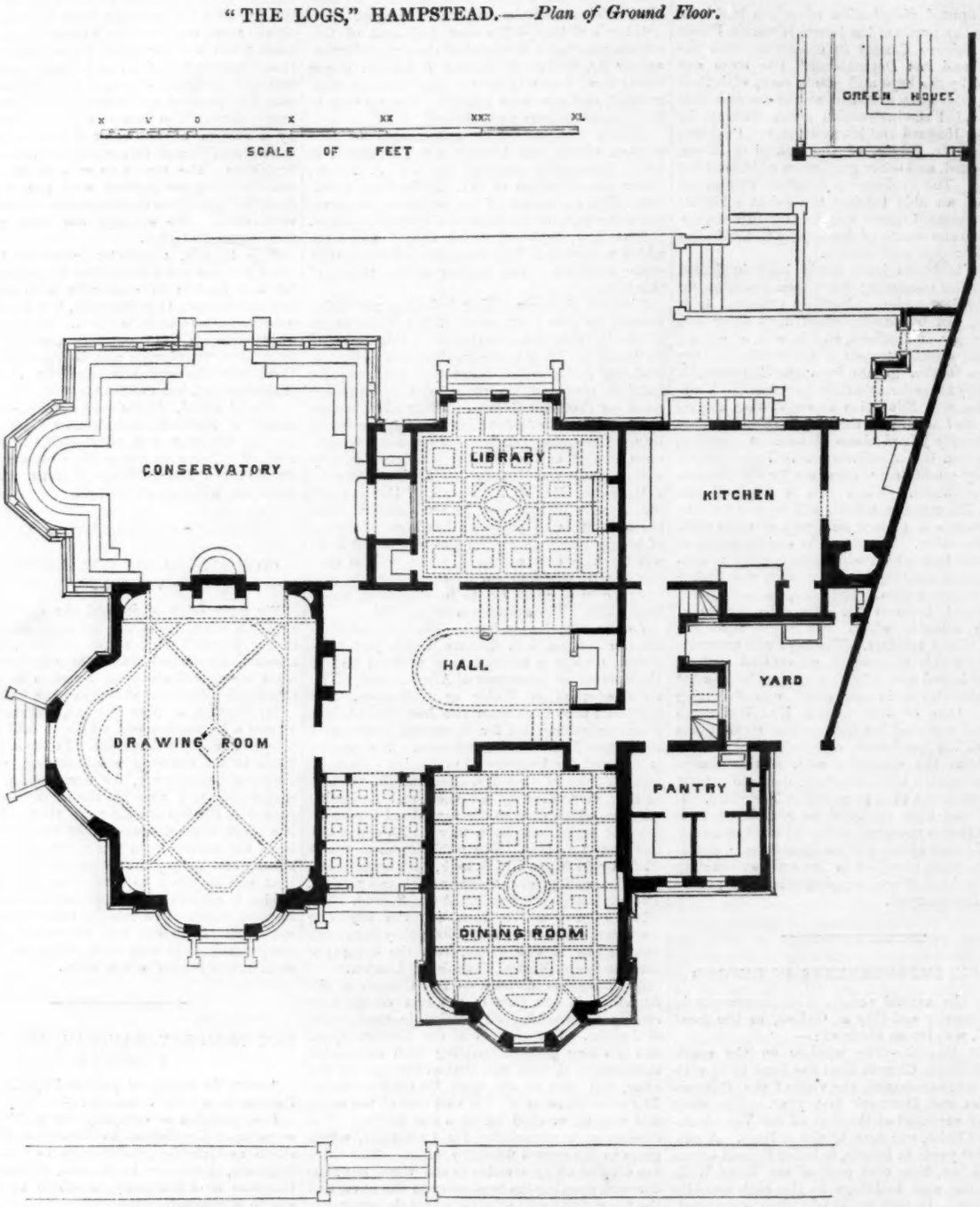
Incorporation of company for making tramways from Kensington to Hounslow, Hammersmith to Uxbridge, Paddington to Harrow and Edgware, Islington to Barnet, Newington to Charlton next Woolwich, Lambeth to Croydon and to Richmond.

Incorporation of company: construction of railway from near the west end of Oxford-street to Cheapside, in the City of London (to be called the Hyde Park and City Railway, and running as follows): commencing in the parish of St. George, Hanover-square, in the county of Middlesex, near the west end of Oxford-street, and thirty-three yards or thereabouts westward of the Marble Arch, and terminating in the parish of St. Michael at Bladum, otherwise St. Michael-le-Querne, in the City of London, near the western end of Cheapside, and at or near the junction of Foster-lane with Cheapside, to make and maintain the said railway, wholly or partly, as an underground railway, and to pass through and under the following, or some of the following, among other roads and streets, that is to say,—Uxbridge-road, Bayswater-road, Oxford-street, Duke-street, Regent-street, New Oxford-street, High Holborn, Holborn, Holborn-hill, Holborn Viaduct, Victoria-street, Farringdon-street, Skinner-street, the Old Bailey, Giltspur-street, Newgate-street, St. Martin's-le-Grand, and Cheapside, or some of them.

Incorporation of a company to make and maintain a railway from Colebrooke-row, Islington, to New Union-street, in the City of London.

Railways [Metropolitan (Southern District)

"THE LOGS," HAMPSTEAD.—*Plan of Ground Floor.*



Railway] from Elephant and Castle to Waterloo and Whitehall Railway, and from that railway to the Thames Embankment (north) and to Scotland-yard. Incorporation of company, powers as to Waterloo and Whitehall Railway, &c.

Kew and other bridges: to confer upon the Mayor, Aldermen, and Commons of the City of London, and the Metropolitan Board of Works, certain powers with respect to freeing from toll the bridges named in the 5th section of "The London Coal and Wine Duties Continuance Act, 1868," such bridges being Kew, Kingston-upon-Thames, Hampton Court, Walton-upon-Thames, and Staines, over the river Thames, and Chingford and Tottenham Mills, over the river Lee.

Landowners' Association, for the construction of branch railways and other works. Incorporation of company: powers to purchase and hold lands; to construct, work, and manage railways and other works; to levy tolls to raise capital; special provisions for acquisition of lands—powers to landowners and other persons having limited interests in lands to subscribe and hold shares, and to guarantee interest; and to charge the inheritance with subscriptions and guarantees as a prior charge—provisions for compelling such persons to guarantee interest and to charge the inheritance with guarantee as a prior charge; —powers to persons guaranteeing to participate in profits of company, &c. This seems a very broad measure.

"THE LOGS," HAMPSTEAD.

The house we illustrate in our present number is faced with double-pressed Burham bricks (the stables and offices with wire-cut Burham bricks), and has Portland stone dressings. Red bricks are sparingly used in panels, under the eaves and strings. The eaves project considerably from the face of the wall, and have a panelled soffit of Portland stone, supported on carved cantilevers. Polished granite and red Mansfield stone are used externally, and serpentine and Plymouth rock internally, in decoration.

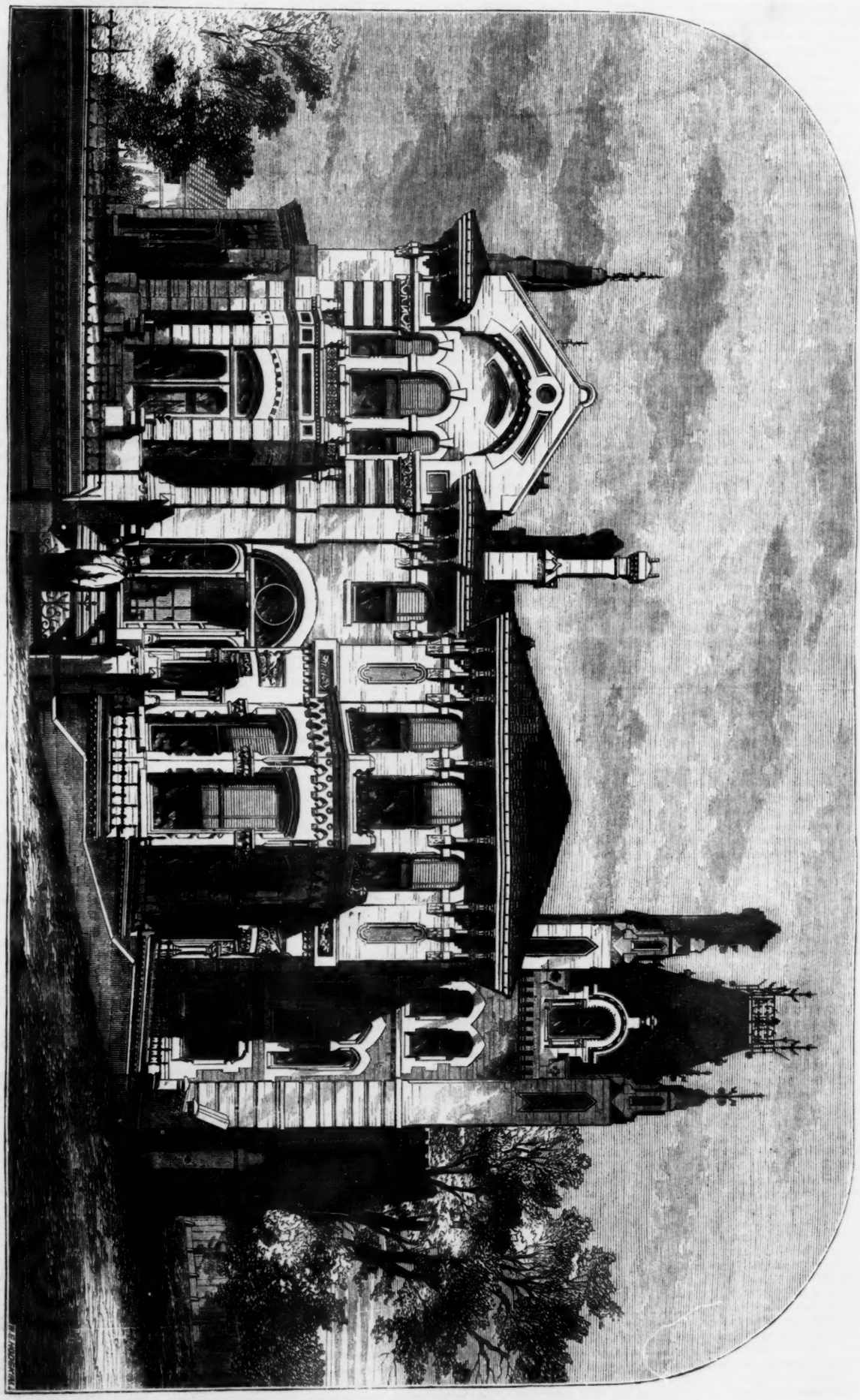
The roofs are covered with the Broomhall Company's patent tiles. Portland stone has been used internally for principal staircase, hall window, and screen between hall and vestibule. The hall, vestibule, and conservatory are paved with Minton's tiles.

There are open stained deal roofs over the hall and billiard-room. The joiner's work generally is of pitch pine, and carved work is introduced in the doors and other parts of ground floor. The drawing-room and dining-room ceilings have pitch pine ribs and cornices, and the library ceiling is wholly of pitch pine. Arrowsmith's parquet has been used for the floors of the principal rooms. The furniture was made from special designs. Parts of the house are heated by hot water.

Mr. J. S. Nightingale, of Westminster, was the architect.

The chimney-pieces were made by Mr. Mitchell, of Brompton-road, from designs furnished. Mr. Shrivell supplied the ironwork; and the contractor for the general works was Mr. Charles Till, of Hampstead.

The cost of the house was about 9,000*l*.



"THE LOGS," HAMPSTEAD.—Mr. J. S. Nightingale, Architect.

THE TRIANGULAR LODGE, RUSHTON HALL.

Long ago we illustrated this singular building, and we have since, at different times, given other particulars of it. Mr. Thomas Powell, who has been examining it, writes,—"I have also had an opportunity of examining those very interesting papers and documents which, some thirty years ago, were brought to light by the pulling down of a wall at the hall. I have not been able to do more than turn my attention to the 'building accounts,' which form a portion of those very curious manuscripts, but I have been able to ascertain from them a few distinct facts, of which the following are some:—

The beautiful fabric at Liveden was commenced, and nearly finished, before the 'Triangle;' and the parties who constructed it were two named 'Grombolds.' The Triangle was not finished in 1595, as is sometimes conjectured, from these figures, with the letters T T, which are placed on the outside. The work was in progress in 1596.

The general stone material was raised at the white stone [and red stone 'pittes,' at 'Hawke filde.' 'The skunchions' (shields?) were from Pipwell.

Ordinary masons did the plain work, including the ashler; but Freemasons executed all the symbolic matter. The names of both sets of workmen, together with those of the parties who did the windows, are given.

The Triangular Lodge has been mistaken for 'Wadener's Lodge;' they were entirely distinct fabrics, as appears from the building accounts; but of the latter there are, I believe, no remains.

During a great part of the time that both the fabric at Liveden and the Triangle were in course of construction, Thomas Tresame was in prison at Elie (Ely). To meet the cost of building, he sold, at intervals, lands at Clipston.

The 'spirit-rapping' did not occur in the Triangle. The building is simply the gratification of an exquisite taste in architecture, subvented by a deep religious triune enthusiasm.

The term 'triangle' is applied to the building by Tresame himself. I think an explanation of all the symbols might be found in the 'accounts.'"

We should be glad to have the exact words in which the distinction between the ordinary masons and "freemasons" is made.

HARVESTING IN WET SEASONS.

The prize essay on this subject, by Mr. W. A. Gibbs, of Gillwell Park, Essex, has been printed in the Journal of the Society of Arts, which Society awarded the prize. We have already given an account of Mr. Gibbs's method of drying wheat, hay, &c., by means of the hot-blast, &c., and his own account is so lengthy and diffuse that our limits do not allow us to give any intelligible quotation from the essay; but we may give an account of his wheat-drier as constructed for the Duke of Sutherland, after remarking generally that the essay first of all gives particulars as to various modes of harvesting crops in wet weather in different countries. As to a mode recommended in our columns to be used at a pinch, and where elaborate and costly "wheat-driers" with their engines, fans, furnaces, wheat-houses, hot blasts, elevators, &c., were not to be thought of or attained, even had they been then invented, Mr. Gibbs speaks of it as "an absurdity," although he acknowledges that it was "the old Roman plan," and that it has been "partially revived in Australia," and is "the last resource of a forlorn hope,"—where, of course his "wheat-driers" are not even to be hoped for. To us it seems to be a still greater absurdity for Mr. Gibbs to present the country with such a system as his, by way of a solution of the problem how (short of at least half a century's progress amongst farmers in general) to harvest crops in wet seasons. The *original* suggestion in the *Builder*, by the way, was not the old Roman plan referred to by Mr. Gibbs, of beheading the corn "as it stands" in the fields, but after it has been cut and bundled, and has stood waiting favourable weather which has never come. Then it is that the beheading process might perhaps best be done with sickle or with chopper, leaving the straw ready cut and standing as before, in the best possible position in the field for its preservation till drier weather should come. This original suggestion was certainly so far modified in our subsequent remarks as to recommend, in very wet seasons—where it was desirable even to harvest the crop before the cutting of the straw—to save the heads at least, by at once reaping them where covered accommodation for drying straw and all was out of the question. Either of these modes, we will venture to say, will be adopted in nineteen out of every twenty cases, were one alone on Mr. Gibbs's system will; and for this plain and obvious reason, that out of every twenty farmers, either in this country, in Australia, or in any other country, for the next half-century, not more than that one is likely to be either able or willing to provide himself with Mr. Gibbs's "wheat-driers," on the chance of needing them for wet seasons. While describing his system, therefore, we venture to say that the grand problem of saving the crops of a country in wet seasons has not been solved by him, at least.

The "wheat-drier" referred to comprises a steam-engine, with cold and hot air blasts, a furnace, and a wheat-house, covered and fitted with perforated cones on which the wheat is temporarily stacked, while the blast of hot air enters through the perforations and dries the bundles. The wheat is then taken to an elevator provided with a blast fan, also worked by the steam-engine, and which blast fan propels each bundle through a long and wide table or atmospheric hoist to the top of the stack where it is to be stored when thus dried.

By a modification of his process, rather confusedly and wordily described, Mr. Gibbs mentions that 45 lb. of "grass saturated with the heavy morning dew was dried into 9 lb. of bright green fragrant hay in fifteen minutes, by maintaining a steady temperature of 320° for the ingoing air. This [he adds] was my first experiment with steam-power in lieu of hand labour; but I have since, with my smallest model, succeeded several times in drying grass in a similar condition into perfect hay in six minutes, using a temperature of 380° and a velocity of 1,650 revolutions per minute."

In conclusion, the author says:—

"If it be remembered that this new adjunct of the steam-engine begins its work with the first crop of hay, can next be applied to wheat, oats, barley, and the whole range of cereals, is then at hand to finish the second crop of hay, and enables us to dry the artificial grasses at any season of the year, it would seem as if it were destined, perhaps at no very distant period, to complete that perfect circle of systematic husbandry which now begins with the steam-plough and ends with the thrashing-machine.

When continuous employment can once be found for the 'iron horses,' we may hope to see them on every considerable farm in the kingdom; first breaking up and cultivating the soil; next, mowing, reaping, and gathering the produce; and, finally, passing from field to field and from farm to farm, saving, drying, and bearing home the harvest."

Meantime, and till this good time has come (and no doubt it is coming), the world still wants some rough and ready means of harvesting crops in wet seasons.

THE INQUIRY AS TO THE FAIRFORD WINDOWS.

Sir,—In my former letter I alluded to certain specific differences that existed between the works of Albert Dürer and the Fairford windows. I shall now endeavour to show that the motives, the sentiment, and the principles under which both artists worked, were no less at variance. The artist of the windows was altogether an artist of the Middle Ages. He obeys the traditions, and confines himself entirely to the conventions of ecclesiastical art. His thoughts never stray out of their beaten path. His beauties and his defects are those of his school. The uncouth drawing that appears in the nude and lower extremities is not the result of youthful imperfection, but of the settled conviction of one who has not recognised scientific drawing as an artistic necessity. It is conventional, as is also his treatment of his subjects, and can be paralleled in abundant instances in the works of the Flemish school, in sculpture as well as in painting. The pensive, quaint, almost melancholy air of the single figures of the prophet and apostles, pleasing as it is, is somewhat monotonous; no great distinction of character is attempted, by which the personality of the artist could be made known from amongst his contemporaries. Now in Albert Dürer we have quite a different man. He belongs to the *cinque-cento* school of art, rather than to that of the Middle Ages. Educated, as he must have been, with all the traditions of ecclesiastical art around him, he obeys them or neglects them at his pleasure. His ardent—nay his devoted—study of nature appears in all his works, small or great. He is no conventional draughtsman, but one who has studied from the living model with a thorough knowledge of its anatomical construction. The splayed foot of the Flemish school, as in the Fairford windows, is impossible to Albert Dürer, and is not found in a single example known to be by his hand. It is equally impossible that so great a student of nature, animate and inanimate, could have drawn the ass and horses in the east window of the above-named church. His licence in the use of costume is like the freedom from restraint that marks him in every particular. He composes a costume for his Roman soldiers which is neither Mediæval nor antique, nor of his own time, but made up of all sorts of elements; so also of other figures. Energy and power are his chief attributes: he shrinks from no difficulty, but grapples with it, where others have avoided the contingency. Let us examine, as an illustration, his treatment of the subject of the "Agony in the Garden," as expressed in the "Small Passion." And here let me observe that, in alluding to this series, I do so on account of its being favourable for such examination. If the Fairford windows cannot bear this test, they have but small chance with the larger and more important works. Most artists, in the treatment of this subject, have declined to represent the anguish of that terrible hour. The figure of our Lord is usually shown merely as praying with the sleeping disciples about him. But here, the almost convulsively-clasped hands and bowed head speak with bitter truthfulness of the mental agony of the moment, expressed in the words, "Father, if it be possible let this cup pass from me." The pathos of this little composition finds no parallel at Fairford, and in his larger composition of the same subject A. Dürer again differs from himself and the ordinary treatment, whilst the artist of the windows keeps to the old path trodden before him. The architectural background must also be contrasted with those of the two works on "The Passion," because the difference between them shows that the minds of the two artists ran in diverse directions. At Fairford all the backgrounds are Mediæval; in A. Dürer's, Classic, or *quasi*-Classic. The distinction is important, as it shows that, whilst the one extended his thoughts beyond his own time, the other was content to represent his subject, in true Mediæval conventionalism, as if the occurrences were of his own day.

Whilst upon this subject, I may allude to Mr. Taylor's inquiry of Mr. Clayton respecting identity of background at Fairford with Nuremberg details.* The towers, &c., in the window may easily be illustrated in old towns on even the Lower Rhine, as at Andernach, as well as in the old Belgic towns. But a glance at Braun's views published in the sixteenth century will show that it is not necessary to travel much beyond the German Ocean to illustrate the scenic backgrounds at Fairford. Of the style of the canopies, I stated at the meeting of the Architectural Institute on the 6th inst. that *not a single* example of Nuremberg detail was visible there,—indeed, I exhibited a tracing from German glass in my possession, showing the distinction. I also stated my opinion that the canopies were distinctly *Flemish*.

Having thus stated what, in my opinion, are distinctive differences fatal to the attributor of the windows to the hand of A. Dürer, with whose special style I find no agreement, it may be interesting to point out other works of the same age in our churches, having a close analogy with them. In the north transept of the Abbey Church of St. Alban is a representation of the "Incredulity of St. Thomas," in mode of treatment and character similar to that at Fairford. Among the very pretty examples at West Wickham, Kent, perhaps a few years earlier in date, we find details similar to some in the windows under consideration. Such, for instance, as the sword in the hand of St. Catherine, crown, &c.; and the head of St. Christopher will certainly compare with the best of those at Fairford. But the very curious series of wall-paintings in the Lady Chapel at Winchester Cathedral, though almost effaced, of great merit as designs, contain many indications of being executed by one of the same school and period. The turban worn by some female figures in the windows, as also the executioner in the "Judgment of Solomon,"—a remarkable and very distinct costume,—the ample skirts of the females generally, the broad-toed shoes, all ap-

* See p. 845, *ante*.

pear in the paintings. Now, these are valuable for comparison in one point at least,—viz., they furnish a *date*. The paintings were executed by Prior Silkstede in 1489. Now, I utterly throw from this inquiry all tradition. I place no trust in it. But working from independent sources, comparisons of costume and the like, I should certainly place the date of the Fairford windows in the fifteenth rather than in the sixteenth century. In fact, every bit of evidence, given out by themselves, points to that conclusion. There is another very interesting work for comparison that is Flemish, having close analogies with the costume in the Winchester and the Fairford works. I allude to that magnificent volume of the "Roman de la Rose," Harl. MSS. 4425, in the British Museum. It is many years since I have examined it, but I have memoranda which certainly refer it, with the above, to a common school of art. This work dates about 1480. I much regret that when at Fairford I neglected to note particularly the details of the kneeling figure in armour in the west window of the south aisle; because here we should certainly find data which would solve this interesting point to at least within a year or two. As it is, looking upon the subject in a purely archæological point of view, the date of the windows must not trespass much beyond the boundary of the fifteenth century. The Dantzic picture, whose identity with the windows Mr. Taylor could perceive, yet singularly enough not how much it diverges from the style of A. Dürer, now takes its place as a witness for the attribution of them to the Flemish school (*vide Builder*, 7th instant), and also bears upon the question of date as the artist, Dierick Stuerbout, died in 1478, close upon the time in which the above referred to works were executed.

Supposing that we admit Mr. Holt's postulate that A. Dürer was engaged at one period of his life in designing for painted glass, which is probable enough, yet this is as far as ever from proof that the Fairford windows are by his hand. Many others were working in the same direction, and our task is to decide by the *only* certain means left us, viz., comparison of styles, whether they are by the hand of Dürer or from one of another school. No amount of personal history, short of direct proof, can stand in the way of this test. To sum up in brief, my objections are:—1. That the mind of the artist of the windows and that of A. Dürer, as shown in the treatment of the same subject, differs materially. 2. That he is inferior in artistic ability and knowledge. 3. That the details of his work, costume, architecture, &c. do not coincide with those shown in A. Dürer's compositions.

J. G. Waller.

DANGER IN THE CEILING.

Your correspondent very properly calls attention to the accidents from the fall of plaster ceilings. I think, however, that these mishaps sometimes take place not through any scamping in the work, but owing to the plasterers fixing the laths so close that no proper key can be formed behind; hence, either vibration or a sudden jar will detach considerable portions. Sometimes, also, floors are constructed with a slight camber, and the plasterers in their endeavours to make the ceilings under them perfectly level increase the thickness towards the centre, so that the additional weight alone breaks the key and brings down the plaster.

While on the subject of ceilings, however, I have a caution to give. Possibly some of your readers may know a small covered way called Trinity-place, next to Stanford's, the publisher's, at Charing Cross, leading to official chambers in the court at the rear of Northumberland House. This passage is 6 ft. wide and 35 ft. long. The ceiling consists of eight iron joists, with Yorkshire rag stones bearing upon them. Passers-by supposed this to be mere fireproof construction. Not so, however; for it seems the party-walls between the houses facing Charing-cross rested on the centre of these cast-iron joists, which were put in about thirty-five years ago. On the night of Saturday, the 14th inst., loud reports were heard; and on Sunday morning, by a timely discovery, it was found that seven of the cast-iron joists had snapped in the centre, and it was a providential circumstance that a great catastrophe did not take place. Fortunately labourers were at hand; the front wall was shored up, and stout timbers wedged up under the cast-iron joists, sufficient to prevent further mischief. A more striking instance could hardly be found to show the great danger of using cast-iron in such positions. It was suggested that the wires of the Electric Telegraph Company, which touched the iron, might have had some effect upon it; but being sheathed with india-rubber, they could have had no injurious influence upon the metal.

B. F.

Sir,—The suggestion of your correspondent, of straining wires across bad ceilings to prevent their falling, is very good in its way, but will only apply in cases where the surface of plaster is sufficiently hard to resist the cutting of the wire; besides, the process of fixing will be attended with considerably difficulty. My remedy for old cracked or dangerous ceilings is papering. The strength and durability of paper in this respect is almost incredible, and very little known. Ceilings with a very threatening aspect, and appearing in a very bad way, have, to my knowledge, been sustained twenty years or more by two or three coats of paper. In extreme cases, brown paper, well lapped previously to the white or lining paper being laid on, is necessary.

I can say, after many years' experience in this branch of the building trade, I have never known it to fail, and can recommend it both as a remedy and a preventive.

Thomas Dawson.

THE SPIRE OF SALISBURY CATHEDRAL.

A correspondent writes thus:—"Some weeks ago, being in Salisbury, I was assured by a gentleman who resides in the Close, and is connected with the cathedral, that the beautiful spire was not constructed of stone, but of some composition of lime or cement, resembling concrete. He said also that our forefathers had a knowledge of such mixtures, which has been lost. This was a new idea to me; but having read several of your recent articles and letters on the subject of cement or concrete structures, I see no reason to doubt the accuracy of my informant's statement. If you will be good enough to allow this to appear in the *Builder*, it may elicit interesting information as to the real material of which the Salisbury spire is made from any one who may have examined its nature."

This notion seems to be somewhat extensively entertained, for within three weeks we have received the inquiry from three different quarters. It may be as well, therefore, to set it at rest definitely, and this we are able to do with the authority of Mr. T. H. Wyatt, and Mr. Fisher, the clerk of the works at the cathedral. The latter gentleman, we may say, and his father before him, have had charge of it for about 100 years, and he knows every stone in it. The statement, then, is incorrect. The spire is built of Chilmark or Tisbury freestone ashlering, solid. The tower is built of the same material, but is not solid, being filled in with a very hard material, similar to concrete of the present day: this filling has hitherto been found to be very firm, and some statement with regard to it has probably led to the misapprehension as to the material of the spire.

ROAD-MAKING.

The paragraph of "X. Y. Z." on roads seems to have attracted attention, and my endeavour to enlighten his darkness by quoting from some of Telford's specimens has aroused a host of writers anxious to question the enlarged knowledge and experience of the great leviathan of road-makers.

I am not disposed, even if you would afford space, to unearth the subject of Telford *v.* M'Adam roads, as that subject was thoroughly investigated and sifted by the last generation of engineers, and all the scientific men of that day acknowledged the superiority in every respect of the system of constructing roads as laid down by Telford over those constructed by M'Adam. It was scientific and more durable, and therefore cheaper; it lessened the tractive power of moving bodies as established by many experiments, and therefore lessened the labour of horses, and promoted economy of transit,—important points in these days, and doubly so in those of inefficient communications.

Your correspondent "Pro" takes exception to the laying on of 6 in. of metal at one time. That was part of Telford's practice in making new roads: it has been found to answer in numerous cases, and I have known 12 in. put on in one coat in the iron districts of Staffordshire and South Wales without any great inconvenience, as the covering of fine cinders or "binding" soon formed a smooth surface for the feet of horses and the wheels of carriages.

And, if your correspondent has not tried the effect of the steam-roller on newly-laid metal 6 in. or more in thickness, with just sufficient "binding" to fill up the interstices of the stones in forming and consolidating a roadway, I would recommend him to try the experiment, and let us have the advantage of the result.

As to the assertion that M'Adam roads are cheaper in town than pavements, "Pro" cannot be aware of the numerous experiments that have been made and data derived from investigating this subject in London, Liverpool, and other places; and I dare say if he could procure the trustworthy reports of Messrs. Haywood, Newland, and others on this matter, he would rather modify his opinions.

If you take the first cost of a well-constructed pavement, and the annual wear and tear, and compare it with a macadamized road under similar circumstances, you will find the advantages are materially in favour of a pavement, which was candidly admitted by Sir James M'Adam in his evidence given before Parliament on this subject. There are other questions to be considered besides the mere comfort of horses travelling over roads; the best surfaces for them to travel swiftly over are not always the best for moving heavy weights. We have to consider the relative power required to move a given weight, and that surface that will economize the labour of draught to the utmost degree is the best adapted for the streets of towns.

Paved surfaces are not always slippery; there are millstone grits, syenite, some granites and other stones that are not slippery, and, if well laid on a good foundation, with open joints crammed with fine gravel or stone chips, they will make a good foothold for horses.

Mr. Morgan appears to be also a disciple of M'Adam, and takes exception to a foundation for a roadway; while I consider, with Telford, that it is a *sine qud non*. We do not want an elastic surface that would obstruct heavy weights at every foot as they advance, but one that would carry and support weights unyieldingly as on our railways. I have travelled on railways with a yielding roadway, but it is not pleasant; it forcibly reminds me of being afloat in a small boat on a short and chopping sea, and must involve a great sacrifice of moving powers.

I think a solid foundation for a roadway, of concrete or otherwise, as essential as one for a house, a castle, or a bridge; it is the neglect of this that renders the streets of many of our towns so very unsatisfactory.

Again, he objects to the "binding" as applied in Telford's practices; but that serves to fill the interstices of the stones, and to cement them together, and forms a smooth surface for horses' feet and the wheels of carriages; but the system of applying scrapings or street sweepings, as adopted by the late Pigott Smith in Birmingham, made their streets more like ploughed fields when applied, very heavy for the traffic while consolidating, and an intolerable nuisance to the inhabitants. In reconstructing a roadway I should pursue the course I have indicated above, and as I have carried out on hundreds of miles of road in this country and abroad; but in ordinary and casual repairs I should pursue the system of coating and patching, of just sufficient thickness to maintain a good surface and a correct cross section. No precise or exact thickness of coat will apply in all cases.

I should "lift," if necessary, and the road was strong and would bear it; but "lifting" weakens the foundation of a road, and, I believe, has been carried sadly too far in this country, as road trustees and bondholders know to their cost.

The use of water to roads in the winter months is unnecessary and injurious, as we have frequent showers of rain quite sufficient to assist in the setting of the metal, if all the other matters are properly prepared and arranged, as it is only during the winter months (October to March) that the principal repair of roads and streets should take place.

As to the policy of laying on metal on dirty surfaces, such as are some of the metropolitan roads during the winter, ankle-deep in mud, without any previous preparation, this would be absurd: a thin coat, or sprinkling of stones, as

suggested, would be lost: they are obliged to apply a thick coat that would lead the traffic clear of the seaway of thick, liquid, floating mud.

The object of screening metal is to take out *a part* of the dirt that collects in the course of quarrying, carting, and breaking the metal, as the proportion is usually too great to fill up the interstices of the stones, and soon appears on the surface in the shape of mud: the application of binding on the surface of sufficient quantity to work in and fill up the interstices, is found in practice the better plan, as it works down the more readily, and sets more expeditiously. I think I have noticed the principal objections of your correspondents, which I did not originally intend, but the importance of the subject unwittingly drew me on.

B. Baylis.

HYDE PARK.

May I be permitted to point out in your columns to the authority to whom we are indebted for the present beauty of Hyde Park, an improvement which may appear trivial until the result has been shown?

The Achilles statue, which would be seen to stand out with great effect on entering the gates at Hyde Park Corner, is now completely shut out from view by the trees in front of it. If two or three of these were removed to the back of it, and a bed for flowers sunk in the slope leading up to it, this *place*, which is so much frequented during the season, would then possess all the beauty which can be given to it.

A. P.

CONDITION OF FARNCOMB, SURREY.

LOCAL BOARDS OF HEALTH.

I learnt from your paper some time ago that a sanitary deputation waited upon the Duke of Marlborough to represent the defects of the present sanitary laws.

The organization of a central governing power has now become a necessity of the time. Members of local Boards of Health in many instances are quite incompetent, thereby saddling the ratepayers with unnecessary expenditure. It is not much to be surprised at. How can it be expected that the class of tradesmen and farmers who generally compose a country local Board of Health can have any idea as to the best plan of obtaining a water supply to a town, or the best means of sewering it and disposing of the sewage, and many other questions connected with sanitary engineering? And as they have their daily business to attend to, I consider it is hardly fair to expect more of them than they do at present. I consider the whole sanitary affairs of England ought to be in the hands of the Government, as towns or districts could then be grouped to advantage.

The present Boards of Health, I will admit, are adepts at contention, and waste much of their time thereby, and often create a party spirit in the district, which is much to be regretted, to say nothing of little jobbery affairs that the surveyor has generally to take upon his shoulders.

From recent statements as to the water supply to Guildford, it is seen that after laying out a great deal of money upon old waterworks the water is not fit to drink, thereby raising doubt in the minds of the inhabitants whether the bad quality of the water was not the cause of the outbreak of fever there this last summer.

I observed in the *Surrey Gazette* of the 7th of November that a letter was sent from the municipal department of the Privy Council to the authorities of the next town of Godalming respecting their water supply and drainage.

I have not heard of the fever reaching Godalming yet, but I hear it has got to the adjoining village of Farncomb, where, I am informed, the sanitary arrangements are miserably defective. The water from the sinks runs through a hole in the cottage walls to soak away in the ground. The privies in many cases are within a few feet of the wells. In thunder-storms, the cesspools sometimes overflow, and run down the streets of the village; and open ditches, full of black sewage, were covered in places with a green scum, when I was there in the summer.

What a *wonder* they should have fever come amongst them! Several gentlemen tried to bring about the draining of the village, but they met with so much opposition and illwill from small freeholders owning cottage property, that the project fell through. Amongst other things, tenants occupying cottages at a rental of 2s. 6d. to 3s. per week, were told, if the draining of the village were carried out, the tenants would have their rents raised 6d. per week per cottage.

What course has been taken since the outbreak of fever in the village I do not know; but if remedial measures have not been taken, it is time something should be done.

Looker on.

THE THAMES EMBANKMENT.

Sir,—This noble work stands some chance of becoming an eyesore very soon; and, as the remedy is at hand, no reason exists why every nook and corner should be considered an improvised "stopping-place." The stains are painfully visible, and certainly are becoming detrimental to the appearance of the place. The distance is great from end to end, and there is ample space within the hoarding for any amount of conveniences to be erected. The stairs leading to the embankment at Waterloo Bridge are also filthy; and, although lamps have recently been placed there, they alone will not abate the nuisance. The light of the *Builder* must shine on it.

J. G.

AS TO GALVANIZED IRON FOR PRESERVING OR CONDUCTING WATER.

Sir,—A correspondent in your last week's journal inquires whether "galvanized iron" can be used for water-cisterns with safety.

In reply, I beg to state that I have turned my attention to the action of water on lead and zinc for a period of thirty years, and regret to say that "galvanized iron" (zinced iron) is nearly as injurious as lead for receiving or transmitting water intended for domestic purposes. If water is capable of acting upon lead, it will also act upon galvanized iron, and I would recommend your correspondent to substitute *slate* for the above metals,—*i.e.*, slate cisterns.

For transmitting water the pure tin pipes, or enamelled iron pipes, are preferable to any other with which I am acquainted; but the former are more expensive than the latter, though the enamelled iron are sometimes liable to impart a little ferruginous taste to the water.

Henry Osborn, M.R.C.P., Lon.

REPORTS ON THE PARIS EXHIBITION.

Sir,—Having unintentionally attributed, in a report I wrote on Class XVI. of the Paris Exhibition for our Government, the credit of having executed a very satisfactory reproduction of a picture of "Phideas" by Mr. Poynter, to Mr. Powell, of Whitefriars, instead of to Messrs. Harland & Fisher, of Southampton-street, Strand, I desire to make any reparation I can to them for this slip of my pen.

I shall esteem it a personal favour if you will allow these few lines to appear in the next number of your Journal.

M. Digby Wyatt.

ROUNDABOUT WAYS.

Sir,—I take the liberty of enclosing some advertisements which seem curiosities in their way.

The East-Indian Railway Company require tenders for 800 tons of coal and 200 tons of coke, to be *made* by one of three firms named. As the firms by whom the tenders are to be made are all named, what on earth is the use of advertising for them? Ordinary intellects would suppose that it would be sufficient to write to the three firms, and ask their price. There may be some wise purpose in this, but it is inscrutable.*

From the other two advertisements we learn that the Admiralty wish to send six officers and 154 soldiers from Leith to Dover, and eight officers and 174 soldiers from Milford to Portsmouth. Common people might rashly suppose that with hundreds of steamers at the disposal of the Government, the way to get this service effected would be to put the soldiers, &c., in question on board one of them at one port and take them to the other; but no, tenders are required for the service, to be made on "printed forms," to be supplied by the Admiralty, and sent in "in sealed envelopes;" and no doubt, though this is not specified, to be tied with red tape.

I am told there is a tradition current in Government offices that some important province or island was once given up uselessly by this country, because the "official personage" who conducted the negotiation had not the least idea where it was, and did not choose to confess his geographical ignorance. Is it possible that Leith and Milford represented some far-off unknown localities, instead of places twenty-four hours apart by sea, or twelve by rail? or are these curious advertisements simply examples of the mighty power of routine?

Censor.

* The bungle is in the pointing of the advertisement, which stands thus:—

"EAST INDIAN RAILWAY COMPANY.

The East Indian Railway Company is prepared to receive TENDERS for the supply of,

800 Tons of best Smithy Coal; also
200 Tons of the best Foundry Coke.

To be made by one of the following firms, viz.,—Messrs.," &c., &c., "and to be delivered at Calcutta," &c.

It is not the "tenders" that are to be "made" by one of the firms named, but the "coke;" and the makers of coke would not necessarily tender for the transmission.—Ed.

RESPONSIBILITY FOR DEATH FROM DEFECTIVE PLANS.

In the Court of Exchequer on Saturday last (Sittings in Banco, before the Lord Chief Baron and Barons Channell, Pigott, and Cleasby), the case Moore *v.* Denton and Shipway was decided. This was an action, under Lord Campbell's Act, by the widow of a bricklayer, in behalf of herself and children, to recover compensation in damages for the loss of her husband. It appeared that the defendant Shipway, a publican, employed the other defendant, Denton, who was a builder, to construct a public-house in the neighbourhood of Finchley. Shipway also employed a man named Thomas to prepare the plans and superintend the works. In consequence of an admitted defect in the plans and the structure, a wall fell and killed the plaintiff's husband. It was sought to make both the defendants liable, on the ground that they must have known that Thomas was incompetent to prepare the plans and to superintend the building. The evidence went to show that he was a carpenter by trade, and had acted as foreman of carpenters and as general manager to a builder. The trial took place before Mr. Baron Pigott, in Middlesex, and resulted in a verdict for the plaintiff,—damages, 600*l*. It transpired that the plaintiff was not likely to realise the fruits of her judgment against Denton. During the present term a rule was obtained on the part of Shipway to set aside the verdict for the plaintiff as regarded him, and enter a non-suit, or for new trial.

Mr. M. Chambers, Q.C. (with whom was Mr. J. Bridge), now showed cause against the rule. He contended that there was evidence to show that Thomas's incompetency must have been known to Shipway.

The Court (without calling upon counsel to support the rule) said the rule must be made absolute to set aside the verdict against Shipway, and enter a verdict in his favour. They did not think the evidence proved that Thomas's incompetency was known to Shipway. A foreman of carpenters and a manager to a builder might be perfectly competent to do the work which Shipway employed Thomas to perform; and it was clearly Shipway's interest to entrust the work to a competent person, as he was laying out a large sum of money upon the building. Under these circumstances their judgment would be in favour of Shipway.

CASES UNDER METROPOLITAN BUILDING ACT.

ALTERATIONS.

At Marlborough-street, Mr. Edwin Bull, architect, Holles-street, was summoned before the magistrate by Mr. Jennings, district surveyor, South Marylebone, for certain fees alleged to be due for alterations to a house, No. 9, Duke-street, Portland-square.

It appeared that the house had been rebuilt, and a claim for district surveyor's fees made in due course, one fee being "for inspecting arches under public ways, 10*s.*," which was objected to by the defendant, on the ground that the arches had not been touched. On this objection being made Mr. Jennings withdrew his claim, substituting another of 7*s.* 6*d.* for alterations made to building after the roof had been covered in, such alteration having reference to the cellar in front of the house, and being explained by the surveyor to mean the taking down of a portion of the area wall on which the area railing stood. This alteration the surveyor contended entitled him to half the fee charged on a new building.

The defendant denied his liability, contending that what had been done was by way of necessary repair; and further, that vaults and cellars under public way could not be deemed "buildings" under the Act.

The magistrate was of opinion that a cellar was a building, and that taking down a portion of the area wall was the same as dealing with the external wall, entitling the surveyor to his fee, and made an order accordingly. He thought it, however, a hard case.

SANITARY MATTERS.

At the Clerkenwell Police Court, James Clark, of Union-square, Islington, was summoned before Mr. Cooke, at the instance of the authorities of the parish of St. Mary, Islington, for having a workshop so crowded, while work was carried on, as to be dangerous or prejudicial to the health of those employed therein. Mr. Robert Dunham, one of the sanitary inspectors, said he visited the premises in question on the 30th of October, and found in one room thirteen persons employed in the manufacture of artificial flowers. The length of the room was 18 ft., breadth, 13 ft., and height 10 ft.,—2,340 cubic feet, giving to each person employed 180 cubic feet. The superficial feet of flooring was 234, giving to each person 18 ft. Dr. Ballard said the cubic feet of air allowed to each person was not enough. There was a partition in the room which did not reach the ceiling by 4 ft., and, perhaps, if that were taken down, the room would be sufficient for the purposes of the parties employed. After a long discussion between the magistrate, Dr. Ballard, and Mr. Ricketts

for defendant, it was agreed to remove the partition; and, if that answered the purpose intended, all proceedings would be stopped.

A correspondence has taken place between the new Archbishop of Canterbury (Dr. Tait, late Bishop of London) and Mr. R. Arthur Arnold, respecting recreation-grounds for the poor in Lambeth, the latter suggesting that a portion of the lands attached to Lambeth Palace might be advantageously devoted to this purpose. In reply to a communication to this effect, a letter has been sent informing Mr. Arnold that "his letter shall receive full consideration," but that the new prelate "is not at present in a position to enter upon the subject of it." Mr. Arnold is also reminded that "the late archbishop allowed the use of the Lambeth Palace grounds to the cricket clubs at Lambeth."

There is typhoid fever in Keswick, where a man has just died of the disease, which, it is said, was solely occasioned by the exhalations of decomposing matter in a loathsome pit, over which it was his misfortune to lodge.

MANAGEMENT.

THE part of the approach to the New Meat-market east of Farringdon-road was opened for carriages on Tuesday morning. One of the water companies took the opportunity of opening the roadway of the section west of Farringdon-street (leaving room for one line of vehicles to pass) *on the same morning*, having neglected availing themselves of the six weeks' time they had to effect their purposes.

SOCIETY OF PAINTERS IN WATER COLOURS.

THE seventh winter exhibition of so-called Sketches and Studies (427 in number), by the members of this society, includes many charming works, but differs very little, as we have had occasion to say of their winter exhibition before, from the ordinary spring show. It seems to us it might be as well for the Society to recognise this fact, and to lessen the inducement that may thus be given for hasty and incomplete work, that they should increase the number of members, and limit to a certain extent the right to exhibit. We throw out this hint as one worth consideration, previously to March next, when Associates are to be elected. If the Society in return should desire us to select for ourselves six or eight pictures as a present out of the present collection, we should presently present a list with a strong presentiment, that in our presentment we were naming the artists to whom the exhibition is the most indebted, and it would run thus:—Mr. Gilbert's "City of Worcester" (92); Mr. Lundgren's "Spanish Gipsy" (98); Mr. Lamont's "Illustrations of Bonny Kilmeny" (133); Mr. Burne Jones's "Head" (160); Mr. J. D. Watson's "Waiting for the Boats" (186); Mr. Birket Foster's "Sea" (191); Mr. G. H. Andrews's "Ebb Tide" (273); and Mr. F. Walker's "Lilies" (367). There are some others as good, but we are not avaricious.

METROPOLITAN BOARD OF WORKS.

AT a meeting of the Board last week, the first business was to receive tenders for new sewers and filling up the open ditches in Wood-lane and Lawn-place, Shepherd's-bush. There were seventeen competitors, the highest tender being 12,220*l.* and the lowest (of Messrs. J. & S. Williams) 6,560*l.*, and the latter was, on the motion of Mr. Freeman, seconded by Mr. Layman, accepted.

Mr. Silas Taylor moved, "That the Board do limit the amount to be paid in one year for local improvements to a sum not exceeding one halfpenny in the pound upon the rateable value of property chargeable for that purpose." He did not consider it fair that the ratepayers living in remote districts should be called upon to pay for City improvements.

Mr. Healey seconded the resolution, believing it was necessary to limit the amount of expenditure.

A long discussion ensued, during which it was urged that the Government should aid the Board in making improvements such as the Thames Embankment, which was a national improvement. It was suggested that a small tax in the shape of a halfpenny or a farthing stamp should be charged on metropolitan railway tickets, the revenue to be expended on metropolitan improvements. It was further argued that the great improvements benefited the community, for which all should contribute. Finally, it was agreed to refer the question to a committee.

FROM SCOTLAND.

Edinburgh. — The offer of an ornamental fountain for the adornment of the city having been received, says the *Scotsman*, with objection and opposition in almost every quarter, rather than with encouragement or thanks in any, is now likely to be withdrawn. The suspension of the Caledonian Railway Company's station works at the west end of Princes'-street has indefinitely postponed the prospect of a site being found for the Ross fountain in that quarter; and the only place now open appears to be that originally proposed in the terrace of East Princes'-street-gardens. If that site is generally considered to be eligible, no time should be lost by parties who desire to secure the gift of the fountain in taking action in the matter; for the intending donor is so wearied by delays that he is now resolved to bring the matter summarily to a close.

CHURCH-BUILDING NEWS.

Ewyas Harold.—The church here, which had been in a state of decay for many years past, has now been restored. The work of restoration has been to take down a portion of the tower, which was very much shattered, and rebuild the same, replacing stone for stone wherever possible, and adding new stonework of its original form. The white-washed ceilings have been removed in every instance, and have opened to view an oak-framed roof, which has been renovated and re-covered with local stone tiles and ornamental cresting; the timbers have been oiled. New one-light and two-light windows have been inserted alternately in the nave, and a new three-light window in the east end of the chancel. An archway has been opened out between the nave and the tower, giving increased accommodation for sittings. A new vestry has been erected on the north side of the chancel, and at the south doorway a new oak porch has been built. A heating apparatus of simple construction warms the edifice. The passages are paved with Godwin's tiles. The tower has been underpinned at the north-east corner, the sinking of which had caused a large rent, and the north wall of the nave, which bulged out badly and had recently been propped by modern buttresses, has been rebuilt. The windows throughout are filled with cathedral tinted quarry glazing. The pulpit, the open seating, and the stalls (the original worked in) are wholly of oak, and are made up principally of specimens of sixteenth-century carved panelling, the reredos in particular. The doors, lectern, and altar-rail are of oak, the latter being supported on ornamental iron standards of a foliated design. The bells were originally five in number, but some of them were cracked. They have since been recast by Stainbank, of London, and one added. They were hung by Messrs. Alfred White & Sons, of Besselsleigh, Oxfordshire, bell-hangers for Mears & Stainbank, and who, with other members of the same family, constitute the set of Appleton change-ringers. The bells, in addition to the name of the founder, bear the following inscriptions:—Treble, "S. Ethelbert—Blessing;" second, "S. Mary—Glory;" third, "S. Peter—Thanksgiving;" fourth, "S. David—Honour;" fifth, "S. Nicholas—Power; tenor, "S. Michael—Be unto our God for ever and ever. Amen. W. Jones and T. D. Kedward, Wardens." In the churchyard is a restored cross, a small part only of which belonged to the original. The whole work has been executed by local contractors, Messrs. Edwin and James Giles, of Ewyas Harold, from the design and under the direction of Mr. G. C. Haddon, of Hereford and Great Malvern, architect.

Folkestone.—The report of Mr. Christian, the architect appointed to make an estimate of the probable cost of thoroughly repairing the parish church, has been presented to a meeting of the committee, the Rev. M. Woodward in the chair. The several items and the expense of each were as follows:—In south transept—rebuilding the wall, raising the gable, alteration of the windows, reroofing, re-arrangement of tower-stairs, removing the south gallery, and preparing the floor for the reception of the organ, 237*l.*; in the south aisle of the chancel—rebuilding the wall, inserting new windows, and a new roof, 165*l.*; in the north aisle of the chancel—new windows, new doors, and thoroughly repairing, 186*l.*; repairing and cleaning the stonework of the tower, 35*l.*; refitting the nave seats, 104*l.*; new choir-stalls and re-arrangement of corporation seats under the tower, 135*l.*; colouring the ceilings, &c., 90*l.*; heating the church with hot-water pipes, 250*l.*; making the gas-standards uniform throughout the church, 100*l.* Ten per cent. might be added for contingent expenses. It was announced that about 400*l.* had already been promised. After some little consideration, it was resolved to proceed at once with the south transept, the north aisle of the chancel, the cleaning of the stonework under the tower, the organ, and the new choir-stalls, as it was not thought possible to get the heating apparatus ready for this winter. It was also decided that a complete canvass of the town should be made.

Burwell.—The chancel of Burwell Church has been re-opened for divine worship. The chancel has been erected at a cost of upwards of 1,300*l.* All the ancient carved panel work, the decorated screen, and carved oak roof have been restored. The roof has been re-leaded, the plaster removed from the outer walls, the windows renewed, and filled with tinted glass,—the carved niches restored; oak stalls and seats erected in the place of the square pews, and the floor laid with encaustic tiles. The eastern wall is faced with plaster, and it is hoped a suitable reredos will soon occupy the place of this unsightly wall.

Eltham.—The Bishop of Rochester has laid the first stone of the new church, to be called the Church of the Holy Trinity, at Eltham, and also opened the new national school-rooms. The church is being erected by public subscription, on a site granted by her Majesty. Mr. Street is the architect. The schools, with the master and mistress's houses, have been erected partly by means of funds belonging to the school, but principally by the subscriptions of the inhabitants. They are large enough to accommodate 400 children. Mr. Tasker is the architect. Mr. Naylar, of Rochester, is the builder of the church and schools.

Upton-on-Severn.—It has been resolved to take steps to promote the building of a chapel of ease capable of containing 150 persons, on a site in a central position, adjoining the Hook-road, offered by Major Martin. For this purpose a committee has been appointed, and Mr. G. Row Clarke chosen to be the architect.

DISSENTING CHURCH-BUILDING NEWS.

Keighley.—The United Methodist Free Church at Keighley has been opened for divine service. The foundation stones of the new buildings for chapel and school were laid a year ago last Shrove Tuesday. The buildings are in the Gothic style. The general plan consists of a parallelogram, 86 ft. long, and 48 ft. wide within the walls, exclusive of an apsidal projection 20 ft. deep at the rear for orchestra. The interior is divided into nave and aisles, by a series of ornamental iron columns, from which springs an arcade of seven arches on each side, which supports open hammer-beam trusses across the nave: these, and corresponding trusses over the aisles, have curved ribs or braces on the underside. A gallery runs round three sides of the chapel, three seats deep below the aisles on the sides, and nine deep on the front end. All the seats are open and uniform. On the ground floor there is a clear width of about 3 ft. between the seat backs. A raised platform, in panelled compartments divided by buttresses, and with an ornamental iron balustrade on the top, occupies the place of the usual pulpit. A similar balustrade is carried round the communion. The exterior shows the triple arrangement of nave and aisles, with coupled doorways in the centre of end, opening into a corridor 8 ft. wide, laid with encaustic tiles, and extending between the gallery staircases, which are of stone, on each side. The staircase on the left of the entrance corridor is carried up in a square tower, surmounted by an octagonal lantern and spire, the height of tower and spire together being 125 ft.:

the space is used as a ventilator to the buildings. Over the coupled entrance doorways is a five-light window, filled with tracery in the head. The sides of the building are divided into seven bays, each by deeply projecting buttresses; each bay with two heights of two-light windows, with traceried heads. The upper lights are alternately circular and gabled, the latter running into and intersecting the aisle roofs, and terminated by iron finials. The large end window, the circular side windows, and the tracery of all the windows, are filled with stained glass, and the remainder have stained ornamental margins round, all executed by Edmundson & Son, of Manchester. The floor of the chapel is raised about 6 ft. above the street level, and in the basement under the chapel, and the same size as the chapel, is a school-room, lighted on the sides by a two-light window in each bay. The principal entrance to the schools is at the rear of the chapel, but communication is also provided by a staircase in the tower, under the gallery stairs, so that the scholars can pass from the school-room into the gallery of the chapel without going outside the building for the purpose. On the level of the schools are class-rooms, store-room, stokery for heating apparatus, arrangements for heating water for tea meetings, and other conveniences. At the rear of the chapel, on the ground level, are two large class-rooms, and vestry, lavatory, water-closets, &c. The chapel s lighted by star lights suspended from the arches of the arcades, with brackets under the galleries. The premises will be surrounded by a suitable iron railing, with iron gates and stone piers at the entrance, the piers surmounted by a couple of globe lamps. The whole of the woodwork is stained and varnished, and the ironwork painted in colours and part gilded, under the architect's direction. The different divisions of the building are warmed by the warm-air system of Messrs. Haden & Sons, of Trowbridge. The excavator, bricklayer, and stonemason's works have been executed by Mr. John Smith; the plumber and glazier's works by Mr. James Harrison; the plasterers' work by Messrs. Wilson & Ackroyd; and the painter's work by Mr. G. Lonsdale, all of Keighley; and the carpenter and joiner's works, by Mr. Thomas Smith, of Harden, near Keighley. The total outlay is about 5,000*l*. Mr. William Sugden, of Leek, Staffordshire, is the architect.

Pilsley (*Derbyshire*).—A new Wesleyan chapel has been opened for divine service here. The edifice is built of the pressed bricks of the neighbourhood, with stone dressings from Woolley Moor, and consists of a chapel 54 ft. long, 28 ft. wide inside, with a porch at one end, and two entrances from the same to the aisles; also two school-rooms for girls and boys, attached to the chapel as transepts, shut off by sliding doors, which are opened during service, and obviate the confusion of bringing the children into the chapel. A vault is provided underneath the school-room to receive the warming apparatus, and for other general purposes. The style of architecture is Gothic, of the early part of the fourteenth century. It is fitted up with open benches of deal, slightly stained, as well as the main timbers of the roof. The windows are glazed with quarry plate-glass, with iron casements. The works have been erected by Mr. George Heath, of Chesterfield, builder, from the designs of Mr. S. Rollinson, architect, Chesterfield. The cost is 750*l*., exclusive of any cartage or fence walls.

Books Received.

Illustrated Books from Messrs. Routledge.

"Pictures from Nature," by Mary Howitt, is a charming little volume. To twelve illustrations of the Months, printed in colours, Mrs. Howitt has written with graphic truthfulness and feeling twelve descriptive papers, which bring the events and belongings of the various seasons forcibly and usefully to the mind. We transplant a couple of her paragraphs from the end of "October," relating to an application of science to the labours of the husbandman:—

"The thrashing-machine has given a new feature and a new voice to the country. Our fathers knew it not, and poets have as yet left it untouched in their descriptions of rural life. Listen! There it is humming and booming over stubble-field and wood, like a gigantic bee, or the hives of a whole district united in one great apian chorus. It is the great bee of science singing at its work; triumphing in its newly-created power of absorbing whole harvests, of separating straw, and grain, and chaff, by a speedy analysis of insensate energy, that laughs to scorn the flail and the winnowing-fan of all the ages and nations of the past.

Wonder on, old Jonas, at what will come next. But of this be sure, that before many generations are past, the flail will be a piece of antiquity, known only as resounding through the pages of the old poets, chiming in with the ring of the blacksmith's hammer, through the dark winter mornings of their forefathers. The grim Frankenstein of science, the great humming-bee of innovating times, the strong, snorting mastodon of machinery, is, if not in the next lane, at least in the next season, and will henceforth be as much a feature of October as the stubble-field and the many-coloured woods."

Some of the illustrations are better than others, but the majority well fulfil their purpose. Examined with a glass, they show more expressive drawing than the after-printings have left visible.

To the illustrations in "The Language of Flowers, or Floral Emblems of Thoughts, Feelings, and Sentiments," by Robert Tyas, M.A., we will offer no objection. These also, twelve in number, are printed in colours. They consist of groups of flowers, and are presented with delicacy and skill. Take for examples the first two we open upon, the group of Honeysuckle, White Heath, and Scarlet Ipomæa, and that of Lilac, Spiderwort, and Marvel of Peru. A few years ago these alone would have been cheap at the cost of the book. The volume is handsomely bound, and will please the young ladies.

The same publishers have issued a fourth and pretty edition of Mrs. Jameson's "Memoirs of Celebrated Female Sovereigns," commencing with Semiramis, the first female sovereign upon record who ever held undivided empire, and ending with that fascinating tigress, Catherine II. of Russia.

VARIORUM.

Messrs. Moxon & Co. have published the 1st volume of a new edition of "The Poetical Works of H. Wadsworth Longfellow," and the 1st volume of "The Complete Correspondence and Works of Charles Lamb." The former is edited and prefaced by Mr. Robert Buchanan, himself a true poet, and will have the advantage over previous editions of containing the complete works, divided, for the first time, into two artistic portions, the impersonal and narrative, and the personal and lyrical. The volume of Lamb's delightful Correspondence commences with an Essay on his Life and Genius, by Mr. George Augustus Sala, displaying all the vivacity, skill, extent of reading, and knowledge of persons, that distinguish this most prolific and remarkable writer.——"Everybody's Year-Book" for 1869 is an improvement on its predecessor. It contains a large amount of useful and entertaining matter, and is certainly a good "sixpen'orth."

Miscellanea.

New Tube Well.—The New South Wales correspondent of the *Times*, dating from Sydney, speaks of a tube well, which he considers superior to the "Abyssinian." The tube to be sunk, instead of being shod with a steel point and pierced with holes, is quite open at the bottom, and possesses a free cutting circumference in contact with the ground. It may be sunk through the solid rock. When this is encountered a jumper is used inside the first tube, and this having pretty free motion within the tube makes a way of larger circumference. For quitting the rubbish a tubular jumper is used, which, when filled with material, is withdrawn and emptied.

Poisoning by Gas.—One life has been sacrificed and another imperilled by a new process recently introduced at the Gloucester Gasworks, in the manufacture of gas. The new process liberates sulphate of ammonia, and it is said that means can be adopted for preventing mischievous results; but in the instance referred to there can be no doubt about the cause and effect. It appears that two workmen, named William Hale and Henry Baker, were employed at the gasworks at Gloucester, and while at work at the blacksmith's shop, seeing steam (ammonia of gas) issuing from a valve of the boiler, they tried to prevent the escape by pressing down the valve. The ammonia, however, took such an effect upon them that they both staggered and fell. They were immediately conveyed in an insensible state to the Gloucester Infirmary, where Hale died in a few minutes. Baker has since recovered.

Architectural Union Company. — The annual meeting is fixed to take place on Wednesday next, at the House in Conduit-street. The directors are able again to report an increase from the rentals of the several rooms and galleries during the past year, and they recommend the payment of the usual dividend of 5 per cent., which will leave something handsome in hand to meet contingencies.

A Flight for Fees.—Last Saturday night a prisoner, by a desperate leap, escaped from the custody of a police-officer at the Forest Hill station of the London and Brighton Railway. Bugden and Smith, two warrant-officers of the Lambeth Police Court, arrested James Quinn, of Bell Green, a master builder, under an order of the Court for non-payment of certain fees to a surveyor. While Smith was procuring tickets at the Forest Hill station the prisoner made a dash from the platform. Bugden seized him by the coat, which, however, gave way, and the prisoner leaped from the platform just as a train was coming in, and escaped. Bugden was caught by the buffer of the engine and thrown down, sustaining serious injuries.

Fall of a Roof.—At Liverpool a sad accident has occurred in connexion with the new works now in progress for the enlargement of the Adelphi Hotel, Ranelagh-place, which has resulted in very serious injuries to one man and the narrow escape of four other workmen and a boy. The only portion of the old hotel, standing between Brownlow-hill and Copperas-hill, is the ball-room, situated over what was formerly used as the hotel kitchen, and this the men were proceeding to take down when the accident happened. Five men and a boy were upon the roof, and were about to take out the principals, and for this purpose they had knocked the king-post away, when, without a moment's warning, the whole roof gave way and fell into the room below, carrying all the men and boy with it. The roof, which was 30 ft. in length by 20 ft. broad, fell in a mass.

Destruction of Messrs. Grieve & Co.'s Scene-Painting Establishment.—A fire broke out on Monday morning last on the premises of Messrs. Grieve & Co., the well-known scene-painters, in Charles-street, Drury-lane. The building was at least 100 ft. deep, about 50 ft. wide, and three floors high, and ran as far back as the houses in what is termed the Coal-yard. The lower part of the premises was used as stables, and at the time of the disaster several horses were there. The whole of the upper floors were used as carpenters' shops, painting-rooms, and varnish stores. A number of elaborate scenes for the Christmas pantomimes were being prepared, all of which have been destroyed. We knew the place well, and had a sort of affection for it. It was here that many of the scenes for the Revivals of the late Mr. Charles Kean were executed, in connexion with which we spent many hours in those odd yet commodious painting-rooms.

The London House Painters.—On the 18th instant a lecture was delivered by Mr. Digby Wyatt, on "The History of Decoration by Means of Colour," to the members of the West London House Painters' and Decorators' Mutual Improvement Association, at the St. John's Schools, in Kirkman's-place, Tottenham-court-road. Suspended on the walls were numerous drawings of buildings in Italy, and details of decoration, as well as specimens of textile manufactures exemplifying Persian, Chinese, and other methods of ornamentation. The lecture, besides treating of the Eastern, Egyptian, Greek, Roman and later Italian, and the French styles, explained the principles of conventionalism and imitation in decoration, the latter of which was characterised as dangerous, albeit it embodied the perfection to be attained; whilst the former had the attribute of propriety, and, being more easy of attainment, had come first in the progress of art, and even now was in vogue in some countries. The value of attention to style was also shown. One characteristic of each style was the harmony that it had in itself; and this harmony should not be omitted as a feature when new productions were required. The audience were afterwards addressed by Mr. Crace and others, who urged the importance of establishing classes for instruction in drawing, and other requisites of the house-painter's craft, and who also adverted to the necessity for securing greater durability in painters' work, especially where costly decoration was attempted.

THE METROPOLITAN MEAT MARKET.—The new market in Smithfield was publicly opened on Tuesday last. Illustrations of the building will be found in our volumes for 1866 and 1867.*

THE INTERNATIONAL EXHIBITION.—Mr. Gladstone has accepted the presidency of the Workmen's International Exhibition, 1869. The requisition, we are told, was seventy yards in length, and was signed by workmen only.

BRONZE STATUE OF NAPOLEON III. — An equestrian statue of the present Emperor of the French has just been fixed over the new gateways that lead beneath the great gallery of the Louvre into the Place du Carrousel. It is executed in half relief, in bronze, and is of great size, measuring about 14 ft. each way, and weighing nearly a ton. It is being fixed to the stonework by means of bronze bolts, screwed into sockets in the marble.

CAMBRIDGE ANTIQUARIAN SOCIETY. — At a meeting on November 16th, the president exhibited a series of plans and other documents from the Treasury of St. John's College, relating to the building of the second court. Among these were the ground, first, and second floor plans of that court, the statement of moneys expended, deeds signed by the architects, &c.; also a proposed plan for the third court, according to suggestions by Sir Christopher Wren.

UNITED STATES PATENT OFFICE AND ENGLISH TRADE BOOKS.—The U. S. Patent Office is seeking to obtain for its library copies of all illustrated catalogues, price-lists, and circulars. In many cases, where no illustrations are given, such lists and catalogues are of great service in determining the meaning of words used in the arts, and for other purposes. It is sought to make the Library of the Patent Office a place of deposit for the unrecorded literature of the arts, which would otherwise, in a few years, be entirely lost. Three copies are asked for, one for permanent deposit in the library, and two or more for the use of the examiners. Messrs. Stevens, Brothers, of 17, Henrietta-street, Covent Garden, London, will take charge and forward any that may be sent to them.

ACTION OF WATER ON LEAD. — Professor Parkes, F.R.S., of Netley, calls attention to the fact that it has always been seen that the action or non-action of water on lead could not be entirely accounted for by the usual statements on the subject; and lately Dr. Frankland has made a curious observation, which may throw light on it. He found that water which acted on lead lost this power after passing through a filter of animal charcoal. He discovered this to be owing to a minute quantity of phosphate of lime passing into the water from the charcoal: on comparing two natural waters, —that of the river Kent, which acts violently on lead, and that of the river Vyrnwy, which, though very soft, has no action on lead,—he found that the latter water contained an appreciable amount of phosphate of lime, while none could be detected in the Kent water. This observation may probably explain much of the discrepancy of evidence in respect of the action of soft water on lead.

SANITARY COMMISSION.—The *London Gazette* announces that the Queen has been pleased to appoint Lord Northbrook, the Earl of Romney, Lord Elcho, the Right Hon. C. B. Adderley, the Right Hon. H. A. Bruce, Sir. T. Watson, bart., M.D., Sir C. Lanyon, kt., Lieut.-Colonel C. B. Ewart, R.E., Mr. J. R. M'Clean, C.E., Mr. G. Clive, Mr. F. S. Powell, Mr. A. S. Ayrton, Mr. R. S. Aytoun, Mr. B. Shaw, Mr. J. Lambert, Mr. J. Paget, F.R.C.S., Mr. H. W. Rumsey, M.D., Mr. H. W. Acland, M.D., Mr. R. Christison, M.D., Mr. W. Stokes, M.D., and Mr. S. H. Clerk, M.D., to be her Majesty's commissioners to inquire into and report on the operations of the sanitary laws for towns, villages, and rural districts in Great Britain and Ireland, so far as these laws apply to sewerage, drainage, water-supply, removal of refuse, prevention of over-crowding, and other conditions conducive to the public health; also to report upon the operation of the laws for preventing the introduction and spreading of contagious and infectious diseases and of epidemics injurious to the public health; upon the local administration of the aforesaid sanitary laws; and upon the operation of that part of the registration system which relates to certificates of causes of death.

* Vol. xxiv., pp. 955, 957; and vol. xxv., pp. 261, 263.

ROYSTON HALL ESTATE, KILBURN.—This freehold estate, having a frontage to the Edgware-road, and adjoining the station of the North London Railway, has been purchased by the United Land Company (Limited) co-operating with the Conservative Land Society.

RESERVOIR OF MONTSOURIS, PARIS.—Another great reservoir for the supply of water to Paris, and similar to that at Ménilmontant, is being constructed to receive the waters of the Vannes, which are being brought to Paris by means of aqueducts. The new reservoir is situated close to the new park of Montsouris, not far from the railway-station of the Sceaux line. This reservoir will contain more than 67,000,000 gallons, for the supply of the left bank of the Seine, and such portions of the city on the other side as are not supplied from other sources. The object of the reservoir being built in two stories is to obtain a pressure sufficient to supply the houses in the highest parts of the town.

SOCIETY OF ARTS.—On Monday evening last, the first meeting of the 115th session of the Society for the Encouragement of Arts, Manufactures, and Commerce, was held in the Society's Rooms, John-street, Adelphi, when Lord Henry G. Lennox, M.P., as chairman of the council, delivered an address. Mr. W. A. Gibbs was then called forward, and received the gold medal of the Society, and fifty guineas for his excellent invention for harvesting corn in wet weather. Mr. Robert Creuser, Kingston, received a certificate and twenty-five guineas for having obtained the greatest number of first-class certificates at the examinations of the Society. Mr. Le Neve Foster then produced the Albert gold medal, which had been awarded to Mr. Whitworth, who was not present. Mr. Foster was directed to forward it to Mr. Whitworth.

DOES WATER EXPAND ON BEING CONVERTED INTO ICE?—Two or three correspondents write to us to deny, "as practical men," M. Barthélemy's assertion that vessels are broken, in the act of the freezing of their contents, through gas being given off freely at that moment. Their mere assertion, however, is worth nothing. A correspondent of *Scientific Opinion*, dating from St. Thomas's Hospital, writes more to the purpose. He says:—"This assertion is not true, for I have used water from which the gas has been withdrawn by boiling and exhaustion under the air-pump, and even then an iron bottle, ½ in. thick, and having a bore of ¼ in. diameter, was broken into pieces. If our worthy friend takes into consideration the fact that ice is lighter than water, he must admit that it expands; and this admission will disprove his argument." Even this, however, does not quite settle the question.

MODEL TENEMENT HOUSES FOR BROOKLYN, NEW YORK.—A block of model tenement houses has been built at Brooklyn, on a plan prepared by Mr. J. A. Wood, architect. The cost of the buildings will be about 100,000 dollars. They comprise three buildings, and are located in Stanton-street. One, of 130 ft., fronts in Stanton-street, and there are two in the rear, running at right angles with the front one, back 65 ft., and closing a court 65 ft. square, which is entered through a covered way. The front building is relieved by variety in outline, so as to obviate anything like barrack form. The tenements are divided into suites of rooms, with halls or lobbies, and each contains its own kitchen and other conveniences, complete in itself. Admittance is had from external corridors to which staircases lead. They are not intended for the poorest classes, but for persons of moderate income.

TENDERS.

For completion of Nos. 5 and 6, Collingwood-terrace, Plough-lane, Battersea. Mr. Octavius Symons, surveyor:—

Whittick	£429	0	0
Leader	385	0	0
Shillitto (accepted)	375	0	0

For constructing a sewer in Arthur-street, for the Vestry of St. Luke, Chelsea. Mr. Joseph Pattisson, surveyor:—

Wigmore	£595	0	0
Tassell	593	0	0
Porter	578	0	0
Crockett	570	0	0
Hubbard	570	0	0
Bloomfield	549	0	0
Brass	541	0	0
Hollingback & Badley	510	0	0
Whittick	497	0	0
Neave	485	0	0
Young (accepted)	451	10	0

For a dwelling-house and shop, to be erected on the Godstone-road, Caterham, Surrey. Mr. George Robson, architect:—

Ball	£679	10	0
Galyer	676	0	0
Francis (accepted)	650	0	0
Elliff	643	0	0

For erection of cisterns and water-pipes at St. Marylebone schools, Southall. Mr. H. Saxon Snell, architect:—

Dennis & Scruby	£495	0	0
Benham & Sons	450	0	0
Jennings	418	0	0
Jeakes & Co.	398	7	0
Potter & Sons	375	0	0

For sewers and subsiding tank for the Wimbledon Local Board. Mr. Charles Bird, surveyor to the Board:—

Kent	£1,609	0	0
Brewer & Steggles	1,474	0	0
Tyler	1,434	0	0
Pizzey	1,400	0	0
Marshall	1,394	0	0
Morton & Accombe	1,375	0	0
King	1,368	0	0
Wigmore	1,350	0	0
Dickenson & Oliver	1,340	0	0
Browne & Co.	1,339	0	0
Holmes	1,300	0	0
Harris	1,296	0	0
Pearson	1,269	0	0
Dover & Co.	1,265	0	0
Nicholson	1,260	0	0
Chapel & Holden	1,253	0	0
Killingback & Radley	1,250	0	0
Hayward	1,245	0	0
Chandler & Jarvis	1,235	0	0
Frayne	1,233	0	0
Kelly	1,213	0	0
Robinson, Brothers	1,200	0	0
Tossel	1,193	0	0
Young	1,185	0	0
Falkner & Cowley	1,185	0	0
Paulucci	1,174	0	0
Gardner	1,152	0	0
Bloomfield	1,149	0	0
Carter	1,120	0	0
Rough	1,097	0	0
Moxon	1,085	0	0
Floyd	1,075	0	0
Tinsley (accepted)	1,060	0	0
Barnes, Hassel, & Co.	976	0	0

For rebuilding No. 22, Villiers-street, Strand, for Messrs. Stevens & Sons. Mr. W. H. Saunders, architect. Quantities supplied by Messrs. Rake & Banwell:—

Carter & Son	£1,367	0	0
Baguley	1,211	0	0
Downs	1,127	0	0
Macey	1,098	0	0
Clemence	1,090	0	0
Read	854	0	0

For the erection of a villa residence on lots 5, 6, and 7, the Ellington Estate, Ramsgate, for Mr. Cooper. Mr. John R. Collett, architect:—

Wade	£1,005	10	0
Forewalk	995	19	11
Osborne	988	0	0
Duckett	978	0	0
Elgar	915	0	0
Kelson (accepted)	875	10	0

For alterations and additions to a lace warehouse, in Nottingham. Mr. S. Dutton Walker, architect:—

Simpson & Lynam (accepted)	£930	0	0
Contract No. 2.			
Simpson & Lynam (accepted)	£35	0	0

For a ware-room and sundry additions to a bronze factory, Nottingham. Mr. S. Dutton Walker, architect:—

Fish (accepted)	£262	14	2

For alterations and additions to a chemical laboratory, Nottingham. Mr. S. Dutton Walker, architect:—

Simpson & Lynam (accepted)	£285	0	0

For the erection of a villa residence, with boundary walls, &c., complete, at Chislehurst, Kent, for Mr. D. Chattell. Mr. Joseph S. Moye, architect:—

Grover (accepted)	£4,076	0	0

TO CORRESPONDENTS.

W. T. P. (must see it would be absurd to force a builder to set back his window-frames 4 in. from the face of the wall, and yet allow him to have a wooden roof 6 ft. long and 3 ft. 6 in. wide, projecting from it. The "tool-house" in question was undoubtedly a building).—Reader (we are not able to advise on special cases. There may be salt in the plaster).—Romulus (look to your dictionary).—J. W. P. (next week).—S. D. W. (lists of tenders should give names of all the competitors).—J. T.—T. H. W.—F. W. S.—J. B.—H. O.—J. W. F.—J. R.—B. F.—J. G.—J. P. M.—T. D.—C. R.—Trut.—J. N. C.—W. H. S.—J. M.—Lord E.—G. W. S.—W. & Co.—H. W. R.—F. O. S.—J. P.—Colonel A. P.—T. & R.—H. W.—J. H. S.—C. L.—T. J. H.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

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